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Lymphatic Leukemia; Age Incidence, Duration, and Benefit Derived from Irradiation*

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INTRODUCTION

IRRADIATION by roentgen-rays and radium is a form of therapy that often brings relief to patients with chronic leukemia, though it does not cure either the lymphatic or myelogenous form. It produces distinctly more benefit in myelogenous than in lymphatic leukemia. Enough time has now elapsed since the utilization of effective irradiation to evaluate not only the detailed aspect of the symptomatic benefit but also the results obtained with respect to extension of life. There are numerous reports, as those by Wood¹, Ordway², Vogel³, McAlpin and Sanger⁴, and Oppenheimer⁵, regarding the temporary, often marked improvement that occurs, but few concerning the duration of either form of leukemia. We have recently shown from a study of 78 irradiated and 52 non-irradiated cases of chronic myelogenous leukemia that, though a very high percentage of the irradiated cases were distinctly and often markedly benefited, the duration of life was but little prolonged.

It is the purpose of this paper to evaluate the effect of irradiation and to present some other statistical aspects of the chronic lymphatic form of leukemia. A brief consideration will also be given to acute lymphatic leukemia.

MATERIAL STUDIED

The data given below have been compiled from the records of 98† typical cases of chronic

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†That part of this paper which pertains to irradiation, together with similar information regarding chronic myelogenous leukemia, recently published (Minot, O. R., Buckman, T. E., and Isaacs, R.: Chronic Myelogenous Leukemia; age incidence, duration, and benefit derived from irradiation, *J. A. M. A.* 81: 1519, 1924) was presented in the symposium on "Irradiation in the treatment of non-malignant diseases" at the annual meeting of the Suffolk District Medical Society, April 26, 1924, under the title "Irradiation in the Treatment of Diseases of the Hemopoietic Organs." At that time Dr. Minot also indicated the use and value of irradiation in Hodgkin's disease and lymphosarcoma. The treatment of erythremia likewise was discussed and particular emphasis placed on the necessity of large doses of irradiation, preferably short wave length roentgen-rays, over the bones in order to obtain the best results.

†Some suffice for statistics of one type but not for those of another.

lymphatic leukemia and 57 of the acute form. One of us has observed 65 of the chronic and 32 of the acute cases, but only the records have been studied of the remaining 33 chronic and 25 acute cases. No cases of aleukemic leukemia or unusual forms of the disease are included. The difficulty sometimes arising in distinguishing acute lymphatic from acute myelogenous leukemia is recognized and doubtful cases have been excluded. There are 80 chronic cases over 30 years of age from which end results have been especially studied; 30 of these received no irradiation; 50 did. These two groups of cases are comparable as there is no distinction that can be detected in the character of their disease.

Irradiation was not given the former group because the illness antedated the introduction of intensive irradiation therapy, because of refusal of treatment, or because of an incorrect diagnosis until shortly before death. A considerable number of the latter group did not receive irradiation of the degree or in the manner that would seem best today. However, they did obtain what generally has been considered at least a suitable amount of irradiation to be effective, usually from radium applied over the lymph nodes and the spleen. Only 15 of the acute cases received irradiation.

THE AGE INCIDENCE OF LYMPHATIC LEUKEMIA

Some facts concerning the age incidence, sex, and the time elapsing between the first symptoms and diagnosis will be given, before considering different aspects of the life of the irradiated and non-irradiated patient with lymphatic leukemia.

A curve in Figure I shows the percentage frequency of the time in life by decades when the disease began in 92 cases of the chronic form, and another curve shows the same for 84 British cases reported by Ward⁶. These curves are strikingly similar and show that the decade of life in which the most cases occur is from 45 to 54 inclusive, a decade later than when most cases of chronic myelogenous leukemia develop. Essentially similar curves, though flatter at the top and rising more slowly, are obtained when the data are plotted for the dec-

ades 40 to 49 inclusive, etc., instead of 45 to 54, etc.

The ratio of the percentage of cases of chronic myelogenous leukemia occurring in a given decade to the percentage of the population of the same age after the age of 30, is surprisingly uniform. It is about 2. The percentage number per decade of life of the population in the United States, which is almost the same as that for Great Britain, is shown by a curve in Figure I. It is evident from the data charted as well as from an analysis of the age incidence by other decades that there is not the same uniform trend in chronic lymphatic as in chronic myelogenous leukemia. It is true, however, that the ratio of the percentage of cases of chronic lymphatic leukemia per decade to the percentage of living individuals of like age is about the same for the decade 45 to 55, namely; 4, as it is for the decade 55 to 65, namely; 3.72. The ratio is very different for the other decades, being 0.6 or less for the decades 25 to 35 and below; 1.44 for the decade 35 to 45; and 2.66 for those between 65 and 75 years of age.

A curve in Figure II shows the age incidence based on 57 cases of acute lymphatic leukemia. Another curve constructed from the data given by Ward¹ shows the age incidence determined from 398 cases of "acute leukemia," no distinction being made by Ward between the lymphatic and myelogenous forms. This chart presents graphically what has been recognized, that most of the cases of acute leukemia occur in persons below 25 years of age. From the chart it may be seen that, though the percentage incidence of acute leukemia compared to the number of living individuals of like age is high in children, there is a tendency for the incidence to approach a constant ratio in the later years of life.

THE FREQUENCY IN MALES AND FEMALES

Of a total of 92 cases of chronic lymphatic leukemia 68 (74 per cent) were males and 24 (26 per cent) were females. Seventy-five per cent of Ward's 84 cases were males and 25 per cent females. For 256 cases recorded by Cabot², Vogel³, Ward¹, and ourselves, the ratio of males to females is close to 3 to 1. Ward has shown that the incidence of the disease in females is higher below the age of 15 than above, which is in accord with data given by others. There is a suggestion from our data and that of Vogel and Cabot that the incidence in females is again proportionately greater in the decade 40 to 50 than in other decades after the age of 15. Ward, however, noted essentially the same proportion of males to females in all the later decades of life.

Acute lymphatic leukemia, like the chronic form, is distinctly more common in males. Of our 57 cases, 45 (79 per cent) were males and 12 (21 per cent) were females. Here again there are proportionately more females among

the younger than the older. Eight of the 12 females were less than 10 years of age, as contrasted with 12 of the 45 males. Ward also has noted that acute leukemia is relatively more frequent in females during the first than the subsequent years of life, while after the age of 15 his records of 398 cases show an essentially constant ratio of the incidence of the disease in males (65 per cent) to females (35 per cent). It is also the males who are more often affected (60 per cent) with chronic myelogenous leukemia than the females (40 per cent); and as in the lymphatic forms, there is a relative predominance of females in younger persons. The significance as to why males should be more often affected with leukemia than females, and why there is a greater incidence in young females than older ones, except perhaps for those between 40 and 50 years of age, is unknown and offers an interesting fact for elucidation.

There is no evidence that lymphatic leukemia runs a different course in males than females, so that the statistics given below do not discriminate between the two sexes.

TIME REQUIRED FOR DIAGNOSIS

It has been pointed out⁴ that our patients with chronic myelogenous leukemia seldom sought medical advice until some symptom had existed for months and at that time the nature of their disease was often not appreciated. It is evident that a similar state of affairs exists for lymphatic leukemia. On the average, 100 cases of chronic myelogenous leukemia did not consult a physician until about eight months after the appearance of the first symptom of their disease. Data for 72 of those with chronic lymphatic leukemia show they did the same, on the average, a little over nine months after their first symptom. The correct diagnosis, on the average, was not established in either group until 1.4 years after initial symptoms, or 0.73 years after the patients with myelogenous leukemia had seen a physician, and 0.55 years after those with lymphatic leukemia had done so. The data show that in more recent years the diagnosis has been made somewhat sooner than formerly. The delay in diagnosis is probably dependent upon the fact that the onset of the disease is usually insidious and the early symptoms are those seen so often in many conditions due to functional and organic disease. However, adequate physical examination and laboratory examinations should permit diagnosis when the physician first sees the patient. It is possible that because cases of lymphatic leukemia often have enlargement of the lymph nodes of the neck that are plainly visible, while the patient with myelogenous leukemia often presents no evident abnormality upon inspection with his clothes on, may account for the somewhat shorter time between the first visit to the physician and the establishment of diagnosis in the former cases.

A similar delay in establishing the diagnosis of acute leukemia is evident. The average time before 38 acute cases consulted a physician after their first symptoms was 2.5 weeks, and the average duration of their disease was 2.3 months. (To avoid confusion, available data on five cases living six months or more are not included.) The correct diagnosis for these 38 patients was not made on the average until about four weeks after a physician was seen, or 1.55 months after the onset of the disease. Thus the diagnosis was not established until the condition was advanced, and on the average about three weeks before death, or after the disease had run two-thirds of its course.

THE DURATION OF LIFE OF IRRADIATED AND NON-IRRADIATED CASES

It is recognized that chronic lymphatic leukemia usually persists a few years and occasionally many years, but statistics concerning the length of life after the onset of the disease are meagre. Klewitz and Schuster⁹ and Brandt¹¹ among others have reported from a small series of cases that the average duration of life is about two years and they consider that irradiation, though alleviating the patient, does not prolong his existence.

It is impossible of course to state precisely when the disease begins. For statistical purposes this time has been taken from when the first symptoms or signs attributable to the disease occurred.

Figures III, IV and V give information concerning the duration of the chronic form of the disease in 87 of our cases. Eighty were 30 or more years old. Of these, 50 were treated by irradiation and 30 were not. The average duration of the disease in these 80 cases is 3.5 years, there being practically no difference between the average duration in the irradiated and the non-irradiated individuals, no matter whether one compares all cases or those living less or those living longer than the average of all. The average duration of chronic myelogenous leukemia is very similar, it being 3.50 years for 78 irradiated cases, and 3.04 years for 50 non-irradiated cases. The age at which this disease occurs does not appear to influence greatly its duration. This is in contrast to the chronic lymphatic form, for as Figure III shows this disease in those below 40 years of age is apt to last a shorter time than when it occurs between 40 and 60 years of age. The average length of the disease in the seven cases below 30 years of age is 1.07 years. The data suggest, as do those for chronic myelogenous leukemia, that individuals over 60 years old are apt to have the disease for less time than those between 40 and 60. This may be dependent upon the fact that life expectancy is normally shorter as life advances.

Figure IV shows a curve illustrating the percentage frequency of the duration of the disease

in years. A distinction has not been made between the irradiated and non-irradiated individuals as none of significance could be detected. About 60 per cent lived one to four years, 20 per cent four to six years, 14 per cent six to eight years, while but 6 per cent lived less than a year. Besides the cases of long duration recorded in Figures III and IV, at present there are under observation five cases in an efficient condition who have had the disease between 4 and 10 years. There have also been observed three other cases never treated by irradiation that appear to have an exceedingly chronic form of the disease, all of whom are known to have had a white count between 10,000 and 30,000 per cu. mm. and over 75 per cent of small lymphocytes for 11, 15, and 22 years respectively.

In spite of the fact that this analysis of the data shows no significant extension of life of the irradiated cases as compared with the non-irradiated, the data have been studied in other ways with the hope that evidence could be produced to show that under some circumstances irradiation would permit a more favorable prognosis for life extension.

Irradiation was often begun relatively late after the onset of symptoms. A curve in Figure III shows when irradiation was first given on the average to patients in different decades of life. There were 15 cases over 30 years of age, first irradiated early, that is in the first quarter of their disease, and for whom suitable irradiation was continued, that lived on the average 3.61 years, or essentially no longer than the average of all irradiated and non-irradiated cases. Thus relatively early treatment does not appear to affect the duration of chronic lymphatic leukemia. The average duration of the disease in 19 irradiated cases who had their illness for over four years is 5.54 years, but in these cases the disease had existed on the average (3.69 years) beyond the average duration of all (3.45 years) before irradiation was first given. Some were first radiated less than six months before death, including four of the eight cases living six years or more, while others were first irradiated one to five years before they died. Such facts as well as that the irradiated and non-irradiated patients living beyond average of all had their disease essentially the same length of time, certainly indicate that irradiation played no significant part in permitting these cases to live longer than the average.

It so happens that the longer the duration of the disease the longer it was before irradiation was given. In each of six groups of cases two in each decade of life between 30 and 60, and one living less and the other living longer than the average duration of all, the ratio of the average length of the disease to the average amount of time before irradiation is strikingly similar; for five of the groups close to 1.69 years and 1.89

for the other. This ratio for the few cases between 60 and 70 years of age is higher, 2.7 for those four living less than the average of all, and 2.3 for the two living beyond this time. This constancy in the time that the first irradiation was given as related to the total duration of the disease simply indicates that if the disease was destined to be long, the patients had insidious symptoms for a longer time than those fated to a short course. The former cases on the average developed symptoms that brought them for irradiation a longer time after the onset of the disease than in the latter group. So far as the duration of life is concerned, irradiation is, then, but an incident during the patient's illness, and there is no evidence from the data at hand that it promises a more favorable prognosis with respect to life extension. Such perhaps may occur if cases are treated exceedingly early and with the methods available today, but it must not be lost sight of that too persistent irradiation can readily injure these patients with often a decreased function of their bone marrow.

Acute lymphatic leukemia is a rapidly fatal disease. Of 57 cases, 45 died within six months after the first initial symptom, and on the average in 2.1 months. The other twelve cases had what had been considered the acute form of the disease, particularly because of the persistence in their blood of many immature large and atypical lymphocytes. Their illness lasted from six months to a year. The average duration of all 57 cases is 3.44 months. A little over 50 per cent died in less than two months, a figure similar to that given by Cabot⁴. In 35 per cent the disease lasted two to about six months. Fifteen of the patients received irradiation and though transient improvement and alleviation of certain symptoms occurred in some, there is no evidence whatsoever that the treatment extended life, which is in accord with the observations of Wood¹ and others. In fact, irradiation appears to have hastened the time of death in four instances.

PROGNOSIS AND THE SYMPTOMATIC EFFECT OF IRRADIATION

CHRONIC LYMPHATIC LEUKEMIA

Irradiation is a distinctly valuable form of therapy for chronic leukemia though only symptomatic results can be accomplished by this measure, and in spite of the fact that it does not significantly prolong life. This form of therapy permits the most striking results in the myelogenous type, often enabling those persons in a bedridden state to return to a useful existence for months and even years. Some very definite improvement occurred in 95 per cent of our 78 cases of chronic myelogenous leukemia, and marked improvement in 50 per cent. The percentage of time of efficient life after irradiation was increased at least 30 per cent on the average

above that of 52 non-irradiated cases. Striking improvement is seen much less often in the chronic lymphatic form, yet continued adequate irradiation brings comfort to the patient and offers the best opportunity of maintaining his efficiency. The degree of improvement will vary not only with the amount and character of irradiation, but also with the state of the given patient, particularly as regards the hemopoietic organs, basal metabolism, and the time in the disease when treatment is given.

In judging the effects of therapy one must recall that spontaneous remissions occur in chronic lymphatic leukemia, and that without irradiation patients may remain in a very fair state of health for a long time. The size of the lymph nodes may vary considerably, as may the numbers and characters of the white cells and less often the size of the spleen. Spontaneous remissions of slight degree occurred in but 5 per cent of 36 non-irradiated patients. In about 10 per cent, lymph nodes that were markedly increased in size decreased considerably and usually temporarily. The frequency and degree of the spontaneous improvements was distinctly less than in those given irradiation. It is our object to give below in a generalized manner the effects of irradiation therapy together with some information that enables one to judge the present and future state of the patient. Consideration will not be given here to the different aspects of administering irradiation or to certain details concerning varying symptoms and signs that occur in the course of the disease, including the basal metabolic rate.

The Effect on Efficiency: The most important form of improvement is an increase in the patient's sense of well being. Improvement may occur in the blood, and the enlarged organs decrease in size, but such changes are of little consequence to the patient unless he himself feels better and becomes more efficient. The general improvement the patients with chronic lymphatic leukemia showed following irradiation consisted of a better general sense of well being and increased efficiency, with a decrease of the common prominent symptom, abnormal fatigue. This is attributed to numerous factors, such as those indicated below. A decrease of the basal metabolic rate, when high, often occurred together with the symptoms due to its increase, and a gain in weight. Irradiation also permits alleviation by lessening anemia, increasing bone marrow function, lessening the activity of the formation of lymphocytes, and by decreasing mild or marked symptoms due to enlarged external and internal lymphatic tissue. Respiratory symptoms when present were often rather strikingly alleviated, while deafness was decreased and edema of the legs diminished.

Irradiation was often given those who were leading a fairly efficient life, so that improvement in such patients could not appear to be

striking. Others were treated when they were distinctly sick. There are 61 cases from whom results of therapy can be tabulated. The results regarding general improvement following the first satisfactorily given course of irradiation are as follows: No improvement occurred in 23 per cent, rather trivial improvement in 30 per cent, moderate or distinct improvement in 47 per cent, but these latter cases on the average were improved to a definitely lesser degree of efficiency than comparable ones of the myelogenous type. About 10 per cent of the patients with chronic lymphatic leukemia may be considered as showing striking improvement. The data show that when cases were treated first less than three months before death (12 cases), three to twelve months before death (14 cases), and more than one year before death (35 cases), 75, 21, and 5 per cent respectively showed no general improvement. Sixty-five per cent of those first treated more than a year before death showed moderate or distinct improvement in their efficiency, while but about 20 per cent of those first treated three to twelve months, and 8 per cent of those first treated three months or less before death, showed the same. Subsequent irradiation may permit as marked general improvement as the first course of treatment, but as time passes by, irradiation becomes less and less effective. It may thus be seen that the chances of improvement are in fairly direct relationship with the time before death that the treatment is given. The general effect of treatment is a prognostic guide to the future. The prognosis may be evaluated in greater detail by correlated examinations of the blood, the patient, and his basal metabolic rate.

The Effect on the Blood: Marked changes in the blood usually, but not always, occurred with some clinical improvement; marked changes occurred when there was marked clinical improvement. The actual height of the white count, as noted by others, is but a slight indicator of the benefit to be derived from irradiation. There were 39 cases that had a white count below 100,000 per cu. mm., and 22 with more than this number of cells when treatment was first given. In the former group there were 15 per cent that derived no significant clinical benefit and 36 per cent in the latter group, while 53 per cent of the former group were benefited to a moderate or greater degree, as were 36 per cent of the latter. The white count was markedly reduced and to the vicinity of normal in about 60 per cent of the cases, and in the remaining 40 per cent the changes were not so great. The reduction of the numbers of white cells did not appear to be influenced by their initial height. In 75 per cent of those first treated more than a year before death, the white count was markedly reduced, while in those treated less than three months before death, a similar percentage showed the numbers of cells relatively less affected.

The detailed character of the white cells is of much more importance in judging prognosis than the total numbers. Even so, all facts regarding the formed elements in the peripheral circulation must be evaluated together for the very serviceable information to be derived from blood examinations. The appearance of immature, atypical, and large lymphocytic cells signifies a greater degree of activity than when the lymphocytes are of only small normal type. When the numbers of the former cells were relatively few, they often disappeared following irradiation coincident with the patient's general improvement. Acute phases of chronic lymphatic leukemia are frequently associated with increases of distinctly immature lymphocytic cells in the blood stream. When these cells reached over 50 per cent, the patients seldom lived more than six months and irradiation usually produced little clinical benefit, though a reduction in the total number of cells often occurred.

Following irradiation the previously distinctly high percentage of lymphocytes may become so much decreased as to be less than the percentage of bone marrow leucocytes. The data are not complete enough to state exactly how often this may occur, but it is known to have occurred in 12 cases for a relatively brief period of time, and not to have occurred in the majority of the patients. These 12 cases all had distinct symptomatic improvement, but lived no longer than similar cases in whom the white count was reduced but whose differential count was not importantly altered. In two cases since irradiation a striking reversal of the differential count has persisted for over two years. These patients have never been particularly ill and their count, though never above 50,000 per cu. mm., has remained since irradiation below 15,000 per cu. mm. Such a change in the peripheral blood may occur spontaneously and not necessarily be associated with symptomatic improvement.

In those cases taking a more favorable course, irradiation usually reduced the percentage number of lymphocytes to a slight degree, as well as causing any distinctly immature cells to disappear, and a sharp reduction of the total number of white cells. In general, the cases living in the best state of health with or without irradiation are apt to continue to show not only relatively low total white counts, but also lymphocyte counts (75 per cent rather than 95 per cent) composed of mature cells. An aleukemic blood picture, however, may occur when the patients are seriously ill. Normal lymphocytes not in a very high percentage, with a high level of hemoglobin and blood platelets are the most desirable features these patients' blood can show.

The hemoglobin level is an important index of the state of the patient, and the effect of the disease on the marrow may be indicated by the degree of anemia. When the hemoglobin is 50

per cent or below, it is rare to see much symptomatic improvement. This is in contrast to the distinct benefit often seen in chronic myelogenous with marked decrease in the hemoglobin. Suitable data are available on 23 cases of chronic lymphatic leukemia to calculate the benefit derived from treatment when the hemoglobin was 50 per cent or less. No significant general improvement occurred in 15 (65 per cent), a slight to moderate improvement in 5 (22 per cent), and a rather striking improvement in 3 (13 per cent). Within three months following the first irradiation, the hemoglobin was not altered so much as 15 per cent in 34 of the 61 cases. In many the hemoglobin was 75 per cent or above. In 12 it increased 15 per cent or more, from levels of 50 to 70 per cent, coincident with general clinical improvement, and in 15 decreased this amount from levels of 80 to 50 per cent, with usually increase of untoward symptoms. Two thirds of those that showed 15 per cent or more decrease of hemoglobin in three months were cases treated within 8 months of death. The numbers of red cells in general fluctuated with the hemoglobin so that there was a low color index. Certain detailed changes occur in the red cells that may aid in elucidation of the state of the marrow.

The numbers of blood platelets, like the amount of hemoglobin and the numbers and characters of the white cells, serve rather importantly to adjudge the patient's condition. It is the rule for the blood platelets to be decreased in lymphatic leukemia, perhaps because of a crowding out of their parent cells, the megacaryocytes, in the marrow by the lymphocytic cells. The degree of their decrease, like the decrease of the hemoglobin and numbers of marrow white cells, indicates the amount of marrow insufficiency, which becomes more marked as the disease progresses or is more acute. All cases with the blood platelets approaching normal numbers will be found in good condition, and an increase over previous levels is a most desirable finding. It is surprising how often these elements may be considerably decreased without the patient being particularly ill or exhibiting purpura. Purpura associated with thrombopenia is nearly always present within a few weeks of death. It is not uncommonly observed with fluctuations in its intensity for months and sometimes a year or more before the fatal issue. When irradiation is given in the presence of outstanding purpura, significant symptomatic improvement is unusual. Of 20 cases treated under such circumstances but three showed definite improvement while the condition of the others remained essentially unaltered. In myelogenous leukemia the circumstances are quite different because when hemorrhages associated with decreased platelets occur in this disease, irradiation frequently permits a great increase of these elements to even far

above normal and cessation of bleeding. In lymphatic leukemia following irradiation, a marked increase of the platelets seems seldom to occur, but when it does, it heralds clinical improvement.

Irradiation may thus induce a better production of the three formed elements of the marrow and lessen the activity of the formation of lymphocytes; signs that indicate a favorable prognosis at least for the immediate future. Decreased marrow function which is not improved by irradiation signifies that a further downfall is soon apt to take place.

The Effect on the Lymph Nodes and Spleen:

The effect of irradiation on decreasing the size of the lymph nodes and the spleen tends to be proportional with the amount of improvement in the patient's general sense of well being. In about 25 per cent of the cases enlargement of the peripheral lymph nodes was slight or even absent, and in these cases there was usually no evidence of more than slight increase of any internal nodes. However, the spleen was often considerably enlarged. Distinctly large masses of nodes were nearly always decreased in size by irradiation, so that pressure symptoms due to enlarged external or internal lymph nodes were very rarely not alleviated. This is in distinct contrast to the continued discomfort from such a cause experienced by some of the non-irradiated patients. The amount the nodes decreased in size and the period of time they remained small after the first course of irradiation was greater in those living over a year thereafter than in those living but a few months. Softer nodes and those enlarging relatively rapidly were affected usually more readily than harder ones that slowly increased in size. It is also the former type that spontaneously vary the most in size. Occasionally, immediately following irradiation some enlargement of the nodes occurred, followed by a decrease in their size. Coincident with this enlargement, a temporary increase in the abnormal blood elements occasionally was observed. The amount of irradiation necessary to cause distinct decrease of nodes of a given size varies markedly. An amount that reduces them may not otherwise appreciably affect the patient, though as a rule the patient's health tends to be better coincident with their reduction.

The size of the spleen varies greatly in chronic lymphatic leukemia, and tends to increase as the disease progresses. Its size, however, bears no important relationship to the state of the patient, the condition of his blood, or the future course of his disease, nor do these different factors necessarily fluctuate together. It would seem, however, that cases with relatively small spleens are apt to obtain rather less symptomatic benefit from irradiation than those with larger spleens, while such cases seem to live a comparatively shorter time. Though the

actual size of the spleen does not forecast the future, its reduction following irradiation is usually associated with general clinical improvement. There were 20 cases treated more than a year before death and whose spleens reached to the umbilicus or below. In 11 the spleen was considerably reduced in size, and all were benefited symptomatically. The other 9 that showed rather little change in the size of their spleen after irradiation were benefited, but to a rather less degree than the former cases. Of

even may be hastened by application of radium or roentgen-rays. Treatment may decrease, however, the size of enlarged lymphatic tissue, markedly decrease the white blood cells, and alleviate symptoms for days to a few weeks.

FURTHER CONSIDERATION OF PROGNOSIS AND IRRADIATION OF THE CHRONIC FORM

The rate of improvement and the duration of remissions following irradiation in the chronic form varies greatly. The patients will have a comparatively comfortable existence in proportion to the time it is in their disease. Irradiation becomes gradually less and less effective as time passes by, and as the marrow becomes more and more involved. Often the benefits from a course of irradiation persist three months, rarely a year; while in the advanced cases slight improvements often occur for but a few weeks. However, the proper continued use of irradiation enables these patients to remain distinctly more comfortable and efficient than similar non-irradiated cases. It is to be remembered that non-irradiated cases often remain in a very reasonable state of health for a long time, and that irradiation must be directed to the patient and not simply towards a localized finding or laboratory observation. Each time a case is seen the question arises whether treatment should be given or not. Too much and continuous irradiation can lead to untoward symptoms and undesirable marrow depression, so that it should not be given arbitrarily every so often. It is a question for discussion whether irradiation should be given simply because of enlargement of lymphatic tissue, that in itself does not bother

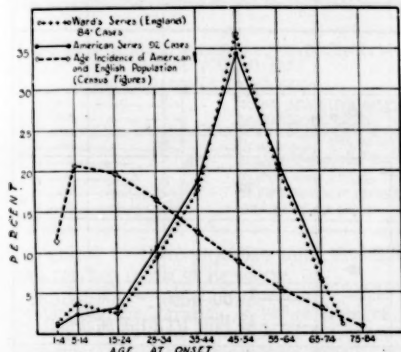


Fig. 1. Age Incidence of Chronic Lymphatic Leukemia.

13 patients with equally large spleens first treated less than a year before death, there were but two in whom the spleen decreased considerably in size. In turn, though symptomatic benefit was not in proportion to the reduction of the size of the spleen, relatively few showed a distinct clinical improvement. In the other cases with the moderate-sized and smaller spleens there were about as many in whom the spleen became reduced as in whom it remained of the same size in the three months following the initial therapy. The small spleens of six cases became distinctly bigger during this period of time. The reduction of these smaller and moderate-sized spleens, that seldom per se bother the patient, is considered pleasing, and yet it is difficult to state that either lack of change or distinct alteration in their size parallels the general state of the individuals. Irradiation of the spleen may not only beneficially affect this organ and the blood, but particularly following relatively large doses it also may cause a decrease in the size of the lymph nodes in different parts of the body.

THE SYMPTOMATIC EFFECT OF IRRADIATION IN ACUTE LYMPHATIC LEUKEMIA

The beneficial effects of irradiation in acute lymphatic leukemia are evanescent and slight as they are apt to be in a distinctly acute exacerbation of the chronic form. Often the patient experiences the discomforts of treatment with a continued downward course of the disease, which

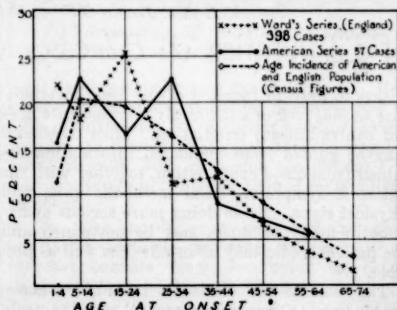


Fig. 2. Age Incidence of Acute Lymphatic Leukemia.

the patient, when he is in a good state of health and his blood and basal metabolism present no especially undesirable features.

As a rule a decrease of the hemoglobin and changes in the different formed elements of the blood indicative of activity and progression of the disease may be observed before distinct downfall of health is evident. The changes are not so clear cut or so easy to interpret as those that

occur in myelogenous leukemia. To treat a patient in a reasonably good state of health for no reason other than that his absolute number of lymphocytes is somewhat increased seems unwise. The basal metabolic rate becomes considerably elevated when the disease process is distinctly active and irradiation then is indicated despite the blood findings, which sometimes do not clearly reflect the patient's condition. One

given somewhat differently than a few years ago and as is now possible by short wave length roentgen-rays. It likewise appears, particularly from some cases now under observation, that the frequency, amount, and rate of symptomatic improvement, and the reduction in size of lymphatic tissue, can be increased beyond the degrees indicated above.

Irradiation therapy for chronic lymphatic

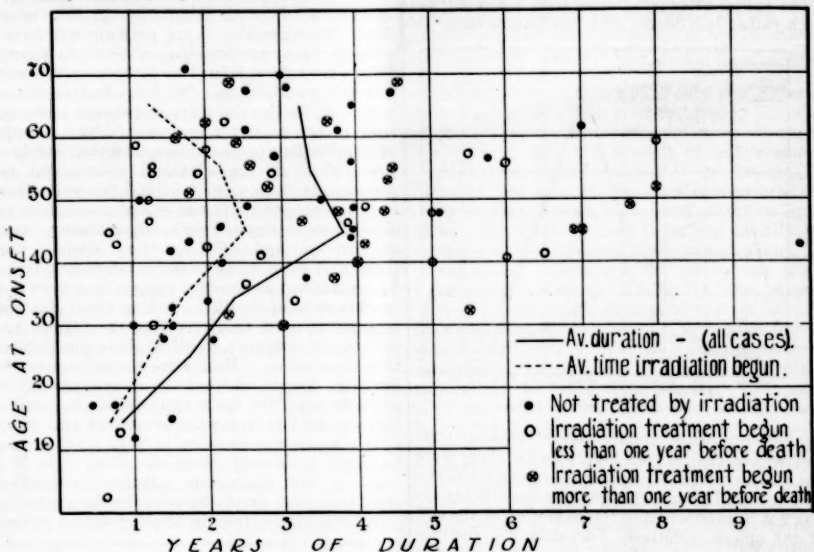


Fig. 3. Duration of 87 cases of Chronic Lymphatic Leukemia

wishes to prevent increase of the basal metabolic rate so that lack of a distinctly elevated rate does not contraindicate irradiation. Thus treatment may be guided from correlated information obtained from blood examination, together with the patient's symptoms, basal metabolic rate, and physical signs. By so doing more serious symptoms in many instances may be postponed and the patient's efficiency maintained as well as possible.

The remarks and statistical facts given above enable one to forecast in a general way the probabilities of the duration of life and the general ability of the patient with lymphatic leukemia. One can often select, but never accurately foretell, which cases, when first seen, are apt to be symptomatically benefited by irradiation.

A forecast for the future frequently can be more accurate when the results of the first course of irradiation are known. Even though data at present do not show that irradiation has extended life, it is possible that irradiation may do so if

leukemia is certainly not to be discredited, although the results of its use have not been so brilliant as in chronic myelogenous leukemia. There is no other form of treatment that gives so much comfort to these patients and allows their efficiency to be maintained so well.

SUMMARY

1. Data are presented concerning 98 cases of chronic lymphatic leukemia and 57 of the acute form of the disease. End results have been studied especially from 80 cases of the chronic form over 30 years of age; 50 treated by intensive irradiation, from radium or roentgen rays, and 30 that were not. The latter serve as a control group to the former.

2. The decade in life in which the most cases of chronic lymphatic leukemia occur is 45 to 55. The ratio of the percentage of cases per decade to the percentage of living individuals of like age is about the same (average 3.86) for the decade 45 to 55 as 55 to 65.

Acute lymphatic leukemia seldom occurs after the age of 25.

3. Both chronic and acute lymphatic leukemia affect males about three times as often as females. Both forms of the disease are relatively more frequent in females in the earlier than the subsequent years of life.

4. The correct diagnosis of the chronic cases was not established on the average until 1.4 years after the first symptoms, though on the average a physician was consulted 0.55 years earlier. On the average, the nature of the acute cases was not

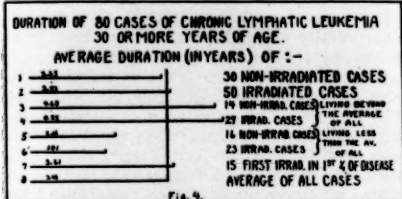


FIG. 4.

recognized by their physician until the disease had run two thirds of its course.

5. Irradiation had no detectable effect on prolonging the duration of either form of the disease. The average duration of life, after the first symptom, of 80 chronic cases, over 30 years of age, was 3.45 years, being essentially the same for the 50 irradiated and the 30 that were not.

The chronic disease lasts a shorter time in younger than older persons. About 60 per cent of all chronic cases live one to four years, and 14 per cent six to eight years. About 50 per cent of the acute cases died in less than two months after initial symptoms.

6. There was a great similarity in the time the different patients first received irradiation as related to the total duration of their disease, indicating that if the disease was destined to be long the patients had insidious symptoms for a longer time than those fated to a short course.

The early institution of irradiation as yet does not promise a more favorable prognosis with respect to life extension.

7. Irradiation, properly administered, undoubtedly benefits symptomatically cases of the chronic form though not to the extent that occurs in chronic myelogenous leukemia.

Moderate or greater general improvement, after the first course of irradiation, occurred in 47 per cent of 61 cases; rather slight improvement in 30 per cent, and no improvement in 23 per cent. The efficiency of 10 per cent was increased strikingly. The chances of improvement are in fairly direct relationship with the time before death that treatment is given.

8. The beneficial effects of irradiation in neut lymphatic leukemia are but evanescent and slight.

9. Irradiation may induce a better produc-

tion of the three formed elements of the marrow and lessen the activity of the formation of lymphocytic cells. The hemoglobin level, numbers of blood platelets, and character of the lymphocytes serve more importantly to adjudge the patient's condition than the number of white cells. An aleukemic blood picture may occur when patients are seriously ill.

Irradiation usually causes little or no improvement of the patient when the hemoglobin is 50 per cent or less, or when outstanding purpura with thrombopenia is present, or when there are many immature and atypical lymphocytes in the peripheral blood.

10. The effect of irradiation on decreasing the size of lymph nodes or spleen in chronic lymphatic leukemia is apt to be proportional to the amount of improvement in the patient's general sense of well being. Very definite exceptions occur but distinct pressure symptoms due to enlarged external or internal lymph nodes were very rarely not alleviated.

11. Treatment should be guided and prognosis formulated from correlated information obtained from the patient's history and physical signs, together with complete blood examinations

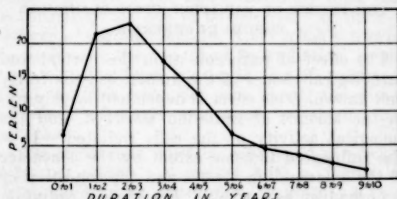


Fig. 5 Frequency of Duration of Chronic Lymphatic Leukemia (87 cases)

and basal metabolic rate determinations. By so doing, in spite of irradiation becoming less and less effective and the patient's comfort decreasing as the disease progresses, this therapy is of distinct value and maintains the patient's efficiency usually much better than if no irradiation is given.

12. The knowledge of today and the new irradiation methods probably will permit still greater benefits from irradiation in chronic leukemia than in the past 10 years.

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Radiation Therapy of the Thyroid and Ductless Glands

BY GEORGE W. HOLMES, M. D.

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Of the so-called ductless glands, there are three groups which are known to show a response to radiation therapy. They are the pituitary, thyroid and thymus. With the first of these, the pituitary, my observations have been limited to the treatment of malignant tumor arising in the region of the sella. My remarks, therefore, will be confined largely to observations on the effect of radiation upon the thymus and thyroid glands.

In previous publications by the members of the Thyroid Committee of the Massachusetts General Hospital, the subject of radiation treatment of the thyroid has been discussed extensively, and a paper is in preparation which constitutes a report of the entire committee on this subject.

In taking up the subject this evening I shall speak only of some of the more obvious results, and refer you to publications of our committee for detailed information.*

THE EFFECT OF RADIATION UPON GLANDULAR TISSUES IN GENERAL

The effect of radiation upon the normal and pathological tissues of the human body is fairly well known. This effect is dependent largely upon the amount of radiation absorbed, and the biological activity of the cells radiated. It is also influenced to some extent by the character of the surrounding tissues and the condition of the organism as a whole. The kind of radiation used probably has very little effect upon the end result.

The effect upon individual glands may be inhibitory or destructive according to the amount of radiation absorbed. While it is difficult, and at times impossible, to study the immediate effect upon the ductless gland, it is possible to make accurate observations of the effect upon the secretions of other glands. If the parotid is radiated, and a sufficient amount of radiation given, the secretions cease. If the dose be repeated, or the amount increased, there is atrophy of the gland and permanent loss of function. No amount of radiation, however small, will increase the flow from this gland. Similar observations have been made upon other secretory glands. The hyperactive gland is more sensitive than the normal. The breasts at the beginning of lactation are easily inhibited by radiation. When lactation is firmly established, a much larger dose is required. While it is possible to destroy normal glands of the lymphatic system, these glands when increased in size as the

result of disease are much more easily affected.

With these facts in mind, it is logical to assume that the ductless glands when hyperactive would become especially sensitive to the effects of radiation, and these conclusions have been borne out by a large amount of clinical data.

RADIATION TREATMENT OF THE THYMUS

It has long been known that the thymus gland is very easily affected, particularly when hyperactive, by radiation either from x-rays or radium. The literature contains numerous reports of satisfactory results following this form of treatment. The effective dose is well below that which would endanger the superficial structures (and there is no other effective therapeutic measure), therefore, radiation treatment is indicated whenever the diagnosis is established, but it is in this that the greatest difficulty lies.

The x-ray diagnosis of enlarged thymus or thymus disease is extremely difficult. The absence of definite enlargement of the thymus as shown by x-rays does not exclude the diagnosis of status lymphaticus. The amount of activity may not be dependent upon the size of the gland. The same gland may vary tremendously in size on different observations. This may be demonstrated by taking a plate during forced expiration, or after the patient has been crying, and comparing it with one taken during quiet breathing, or during full inspiration. Plates taken before and after treatment to be of any value must be taken during the same stage of respiration and without previous crying. I believe that the use of the x-rays as a means of demonstrating the absence of the thymus before operation is a dangerous procedure, and is very likely to give one a false sense of security. The diagnosis I believe should be established upon the clinical findings in the case, the x-ray evidence being used only as a confirmatory finding. When the diagnosis is established, x-ray treatment may be instituted and a satisfactory result expected. Benefit from the treatment may appear within the first twenty-four hours, or it may be a week before it becomes evident. Usually one treatment is sufficient, but occasionally two or three are necessary. The treatment should never be prolonged, and at no time should over two-thirds of the erythema dose be given. The chest may be exposed over the upper thorax in front, using medium length x-rays (.28 E. U.) and giving about one-half of the erythema dose, with a similar exposure over the back.

The following case report illustrates the usual course in this disease when treated by x-radiation:

*Holmes, George W., and Means, J. H.: Further observations on the roentgen-ray treatment of toxic goiter. Arch. of Internal Med., Vol. 31, 303-341, March, 1923.

No. 6538—enlarged thymus—male—age seven months.

Breast-fed baby with history of cyanosis and dyspnea after crying. Has had one convulsion; is under-nourished; eyes and thorax negative; small palpable cervical glands and heart and lungs negative. No supracardiac dullness made out—rosary present—abdomen negative.

X-ray examination showed a definite increase



PLATE I. Plate of the chest of a child, aged seven months, with clinical symptoms of enlarged thymus. Note the prominence of the mid-shadow to the right, and the increase in supracardiac dullness.

in supra-cardiac dullness, with a shadow which lies over the heart and which is more prominent to the right than to the left. The clinical diagnosis was large thymus.

He was given x-ray treatment over the back of chest, one area, 10 X 10 cm. Medium wave length x-rays were used and two-thirds of an erythema dose given.

Two weeks after receiving this treatment, he returned for observation, at which time there was a slight tan over back in region of area treated. Mother says the spasm ceased two weeks after the treatment, and he has had no trouble since.

TREATMENT OF GOITER

Of the greatest importance in the treatment of goiter by radiation is the proper selection of the cases. Only those cases showing evidence of hyperthyroidism should be undertaken. The normal thyroid is quite resistant to radiation. A dose sufficiently large to affect it would injure the overlying skin. Radiation should never be used simply to reduce the thyroid tumor.

Hyperthyroidism is divided usually into two groups, exophthalmic goiter or Graves' disease—and toxic adenomata. In both of these groups, the activity of the thyroid gland is affected by radiation either with x-rays or radium. It is also probably true that both of these groups are handled more satisfactorily by

surgery, as the cure is quicker, and the results are more likely to be permanent.

The advantages in favor of radiation treatment are the absence of fatalities, and the possibility of bringing about a cure without interfering with the patient's routine method of living.

The end results of radiation treatment differ very little from those of surgery. Favorable cases are free from scar or injury to the larynx. The goiter disappears and the exophthalmos diminishes and may disappear entirely. The basal metabolism returns to normal and the patient is entirely cured, and in most instances remains so. I think they are a little more unstable than the surgical cases. Scarring of the neck may occur, if a tanning of the skin is produced, but these scars compare favorably with the bad surgical scars. Injury to the larynx may result from over-radiation, and, while not so distressing as the surgical injury is to this region, it may be quite serious.

I believe that the early cases with soft thyroids react better to radiation than the long-standing cases with hard glands. Those with high metabolic rates are more susceptible than those with low. The early, distinctly toxic case is especially the one to be selected. If there is danger of cardiac damage, it is probably unwise to undertake the treatment by radiation, as the time elapsing from the beginning of treatment until the time when one may expect the disappearance of toxic symptoms is about four months.

The social side must be considered also when selecting cases. A mother with a family of small children, or a man upon whom such a family is dependent, and who is engaged in an occupation which is not laborious, may be handled more safely by radiation than by surgery, and his earning capacity not interfered with, as the following case illustrates:

No. 3763—Exophthalmic Goiter.

A man, forty-two years of age. Toxic symptoms were present for six months. At the time of his first treatment in April, 1920, he had lost twenty pounds in weight during the preceding six months. There was sweating of the hands, palpation, dyspnea, slight enlargement of the thyroid and exophthalmos. His basal metabolism was 40 percent. above normal; his pulse rate, 95, and his weight, 40 kilograms.

He was given one x-ray treatment in April, another in May, and in June a second metabolism test was made, at which time there was a drop to 10 percent. above normal, and a rise in weight to 46 kilograms. Three more x-ray treatments were given, the last in August, 1920, four months after beginning treatment. His last metabolism observation was made in June, 1921, and it was practically normal. His pulse rate at that time was 72; his weight had reached 52

kilograms; and he was practically free from symptoms. He is a tailor by trade, and at no time did he stop work. At the last observation, March 16, 1922, his metabolism was 10 points below normal—and he was considered clinically well.

This case illustrates the prompt response to treatment of a mild, early case,—a cure being

cold tends I believe to increase the effect of radiation.

Radiation therapy is justified in all cases of enlarged thymus in which the diagnosis is definitely established. It is also a valuable adjunct to surgery in the treatment of hyperthyroidism.

In using this form of treatment, the dose should be measured accurately, and should never

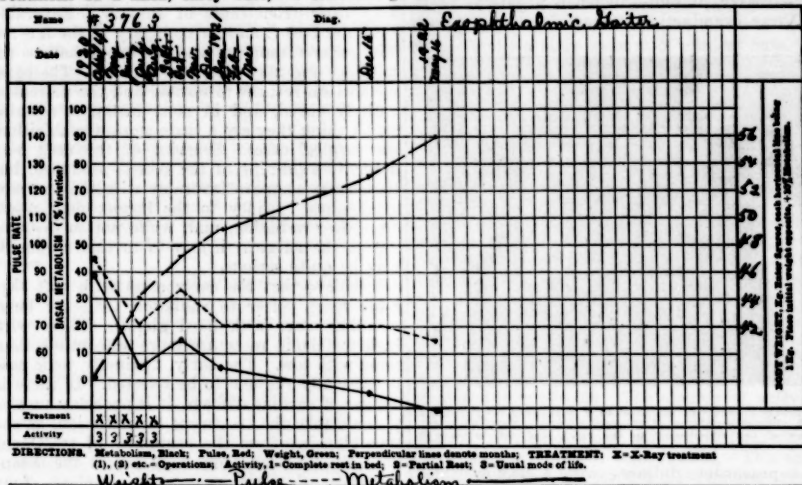


PLATE II. This chart shows the basal metabolism curve, the weight curve and the pulse rate over a period of two years. Note the rapid gain in weight, and the drop in metabolism and pulse rate following x-ray treatment.

brought about in the short period of four months, without interfering with the patient's mode of living or occupation.

TECHNIQUE

We have tried out various methods of administering radiation and have finally adopted the following technique.

Exposure is made over three areas, two over the thyroid and one over the thymus region, in such a manner that each lobe of the thyroid is exposed and the larynx avoided as much as possible. The wave length used is of medium length, and the distance relatively short. Too long a distance or too short a wave length increases the dose to the deeper structures and is unnecessary.

At present, we are using a 12-inch target skin distance and a wave length of .23 E. U. The amount given at each exposure should not exceed two-thirds of an erythema dose, and should not be repeated within three weeks. The number of treatments in a given case should not exceed seven, and five or six are usually sufficient. The patient should be cautioned against applying ointments to the neck, or long exposure to the sun. Heat of any kind or prolonged, severe

exceed two-thirds of that which will produce a mild erythema upon the normal skin. Treatments should never be prolonged or permanent injury may result.

LEGISLATIVE INCAPACITY IN RHODE ISLAND

THE RHODE ISLAND MEDICAL JOURNAL reports that one body of the Rhode Island legislature is divided into groups which have been wrangling for more than four months concerning the appropriations for the Public Welfare Commissions. Funds have not been provided for the Commissions. About four thousand dependents of the state, made up of the insane, the infirm, incorrigible children and innocent orphans are cared for by this Commission which is seriously embarrassed by this failure of the legislature to act.

About eighty per cent of these state wards are under the direct supervision of medical men. The Rhode Island Medical Journal appeals to the physicians of this state to bring pressure to bear which will restore administrative efficiency. There are already indications of disorganization of the departments under this Commission and immediate action is imperatively required.

X-Ray and Radium in the Treatment of Non-Malignant Diseases of the Uterus

BY LAWRIE B. MORRISON, BOSTON

The non-malignant diseases of the uterus, which I shall talk about this evening, are the fibro-myomata, classified under three general heads: the interstitial, the sub-serous and sub-mucous. Of these three, the first or interstitial, especially if myomatous, is the one which yields best to Roentgen therapy. The last two classes are the least desirable for well known reasons.

Perhaps it will be best at this point to ask the question: How does the X-ray act?

For years it has been known that the hard and the soft X-rays affect tissues differently,—the soft ray, of longer wave length, causes a greater reaction, while the hard ray, or short wave length, causes a less reaction in the same length of exposure having the same milliamperage and voltage. There is also a different reaction to these rays by the different cells of the body. On this is the law of Bergonie and Tribondeau based, i. e., "Immature cells and cells in an active state of division are more sensitive to the X-Ray than are cells which have already acquired their fixed adult, morphological and physiological characters." This is perhaps not entirely true, because different rays give rise to quite different effects upon one and the same variety of cells. The reaction is delayed in some patients and acts promptly in others. A careful distinction should be made between the different action which different rays have upon the same variety of cells and the selective action which the same kind of radiation has upon the many different varieties of cells.

Epithelium is resistant to the ray and the erythema dose has been the criteria for estimating dosage on other structures. The highly specialized cells of glands, especially the ovary, the testicle, the thyroid, the lymph, etc., are very sensitive to the ray. Muscle and fibrous tissues react readily to the ray. As before stated, when cell division is active in any structure, radiation is more effective. Seitz, Wintz, Wettirer and others state that the dose value, with skin estimated at 100%, ovaries are 35%, while other glandular tissues and myoma cells are below 100%. Radiation acting on the ovaries causes atrophy of the follicular epithelium, petechial hemorrhages into the stroma, disappearance of the ovum cells and sclerosis. If long continued the internal secretion of the ovary may be effected. The pure myoma of the uterus, being more easily affected by radiation than the fibroma, undergoes degenerative changes. According to (Keiffer?) "The mechanism of the diminution in size of uterine fibroid in the human is variable." He has only been able to establish clinically a diminution in volumes and softening of the fibrous

nuclei, and with the microscope, atrophy with progressive sclerosis. In the course of and following pregnancy, certain uterine fibroids may disappear by a complex mechanism, especially that of a light lipolysis associated with other degenerative processes.

After the menopause the retrogression is observed in the form of a simple sclerosis. In hysterectomies performed after the application of radium or X-rays, the author has frequently found a veritable central necrosis of the fibrous nuclei associated with all the other signs of degeneration observed in the fibrous uterus after pregnancy and in the course of the physiological menopause. Understanding the pathology, one can more easily decide the type of case in which the reaction to radiation will be most effective. Fibromata of long standing are apt to degenerate through arrest of blood supply, by tension, by infection or by other causes. They may undergo necrosis with formation of cholesterolin and fatty detritus, or they may become calcareous. These tumors may become edematous through obstructed lymph supply, or they may become cystic. We may have the pure fibroma or a fibromyoma showing every transition. The small uterine tumor is preponderantly muscular. The large uterine tumor is fibroid, evidently due to the aging, where there is a progressive development of the connective tissue elements, due perhaps to the relatively small vascular supply that becomes progressively smaller. The tumors are essentially benign, but may be secondarily invaded by carcinoma, or sarcoma.

Treatments should be done only by the skilled Radiologist in conjunction with the attending physician or gynecologist. Cases should never be treated indiscriminately but by careful selection. Methods of treatment have been worked out by such men as Albers Schomberg, Haenisch, Bordier, Beclere, Pfahler and many others. The cases treated are many, work having been done since 1904. Results have been good, and, as Beclere says, "Thousands of observations in all countries have demonstrated the efficacy and harmlessness of Roentgen therapy in the treatment of uterine fibroids." He says, "Roentgen therapy is contra indicated only when surgical intervention is absolutely necessary." He believes that there is a direct action upon the uterus itself as well as upon the ovaries, as in a series of 700 cases carefully treated and carefully followed up by skillful gynecologists, the myoma shrinks long before amenorrhea takes place. He says that Roentgen therapy may be looked upon as the best treatment for all small fibroids associated with hemorrhages. It improves the patient's health

without interfering with her occupation, causes a marked reduction in the size of tumors, does away with pressure symptoms, eliminates the nervous shock of an operation and brings about a climacteric involving less disturbance than even the normal menopause. Most of all it is a treatment eminently successful in suitable cases. In his cases he reports 97 4/10% of successes with no mortality.

Indications for treatment depend upon:

1—Age of patient. As a rule the best age is above forty years. The nearer the menopause the better, fewer treatments being necessary. Under the age of forty, cases may be treated successfully but the treatment is more tedious and longer. The menopause may be temporarily induced and ovarian functional activity may return, giving the patient a chance, during the interval, of restoring her health.

2—The nature of the fibroid. The interstitial form is most tractable. The multiple pedunculated, sub-serous, sub-mucous or adenomatous types are best treated by operation.

3—Hemorrhage. Fibromata with hemorrhage react more quickly to radiation. The discharge diminishes and completely disappears. Hemorrhage at the menopause with or without fibroid is easily cured or relieved.

Contra indications:

Calcified fibroid or one undergoing degeneration.

Malignant myomata or infected myomata.

Complications such as suppurating salpingitis, pelvic peritonitis or ovarian cysts.

4—Size of the fibromata. Small fibromata, even up to the size of five months pregnancy, are reduced easily. Large tumors, especially those with pressure symptoms, are better treated by operation.

Cases will vary in rapidity of response according to the size of the tumor, the age of the patient and the biological effect produced upon the tissues. Many improve from the commencement of treatment, others for a time seem worse. The hemorrhage may be aggravated for a period or two but under continued treatment improvement takes place. The tumor shows rapid diminution in size in some cases, while in others it shows very little diminution for a time. (J. A. Corscaden⁴) at the Sloan Maternity, reporting 250 cases of which 203 were treated between June 1914 and July 1922 using radium and X-ray, says, "If the patient is a good surgical risk, under thirty-eight years of age, if the mass is over 15 cm. in diameter, diagnosis doubtful, if sub-mucous or pedunculated, pain pronounced with urinary symptoms, excision employed." In desirable cases X-ray treatment was successful in 91% of the cases; in 3% of the cases X-ray treatment did more

harm than good; in 6% errors in judgment or technique qualified the result. He concludes that Roentgen therapy will stop bleeding of a myomatous uterus, when the bleeding is not due to ulceration; it will cause a myoma to shrink and arrest dysmenorrhea; it will partially arrest pain and urinary distress; it may cause hot flashes,—the rule in the artificial menopause—and in some cases increase the patient's nervous irritability. However, in the majority of cases nervousness is diminished as there is a general improvement. Changes in the secondary sexual characteristics and in the sexual desires and satisfaction are negligible. Blood pressure studies have been unsatisfactory, but there seems to have been an increased pressure in 16% of cases. Normal pregnancy is possible after a temporary menopause.

L. Martingale⁵ reports 93 cases, 51 operated, 37 treated by intensive X-ray, 5 treated by hysterectomy after Roentgen treatment. For 39% the author chose Roentgen therapy. Six of the operative could have been treated successfully by X-ray. Average number of treatments seven. Cases which were considered favorable to treatment by X-ray were the interstitial type. The size of tumor was not larger than six months pregnancy, and menorrhagia was the prominent symptom. Pedunculated fibroid, sub-mucous fibroid and those suspected of malignancy were operated, together with those larger than six months pregnancy, unless the patient had severe heart lesion complicated by anemia,—then X-ray was chosen. Martingale concludes that in faulty diagnosis there is danger in using Roentgen Ray, but in certain straightforward, uncomplicated cases in which the uterus is no larger than a six months pregnancy, with menorrhagia the prominent symptom and the fibroid interstitial, Roentgen therapy is the treatment of choice; also in cases of grave heart lesion. (In cases of doubtful diagnosis exploratory laparotomy.) He advocates divided doses as it does not cause the marked functional disturbances.

L. Stacy⁶ reviewing 600 cases of menorrhagia with or without fibroids, treated with radium at the Mayo Clinic from July 1915—January 1920, —430 responded to a questionnaire, 69 were married women under 35 years of age—normal full termed pregnancy occurred in these cases, three miscarriages and two full termed dead fetuses. One woman was pregnant at six months and still another thought to be pregnant. Eighty-nine cases under 35 years of age reported the menorrhagia controlled with one treatment, 18% received a second treatment, 6 had hysterectomies following radium therapy. Conclusion: Radium therapy is the ideal treatment if the patients are over thirty-five years of age and have a definite, palpable fibroid,—as operation interferes with the function of ovaries and uterus. Large tumors, the size of 4 mos.

pregnancy, should be operated unless there are contra indications. In 263 patients over 40 years of age, menstruation ceased in 70 cases (35%); it became normal and regular in 11 cases (17%). A subsequent hysterectomy was performed in 15 cases. If carcinoma of the fundus was suggestive, abdominal operation was considered the safer procedure.

William J. Mayo¹ says, "The Mayo Clinic has over 200 mg of radium in use and its X-ray department is well organized for therapeutic use. Our experience with radium and X-ray has been wide and we have no prejudices. X-ray treatment for myomas is capable of producing results somewhat similar to radium but is less easy to control, and its effects are less direct and certain. The ovarian tissue rather than the uterine musculature are affected by Roentgen-Ray. There are also possibilities of harmful effects on the intestines and other abdominal viscera by Roentgen-Ray. If the patient is approaching the menopause, if hemorrhage is the chief indication of treatment, radium gives the result so sure and safe that it has no competition. Its use is indicated in patients whose general condition, such as obesity and diabetes, renders an operation more hazardous. If the patient is near the menopause and has a large tumor, especially if there is associated ovarian disease or suspected malignancy, hysterectomy indicated.

J. G. Clark² and Floyd Keene in an analysis of 527 cases of myoma and myopathic lesions say the best interest of the patient demands that both irradiation and surgery be considered in determining treatment. Cases under 20 years usually tend to self-correction. Radium in small doses may be employed as a final resort. In cases between 20 and 35 years myomectomy is preferable considering the probability of maternal possibilities and sexual life. A sub-total hysterectomy, ovaries being preserved is the next procedure. Above 35 years of age, surgical intervention or radiation.

The authors say we would commit a serious error were we to consider this splendid and now effective method of treatment as a competitor of surgery. The two go hand in hand.

As an indication of cases which may undergo malignancy, many authors estimate the incident of malignancy in fibroid as from 0.4 to 10%.

"From Jan. 1, 1910, to Jan. 1, 1923, 4322 cases were operated upon at the Mayo Clinic for uterine fibroids. Sarcoma cells were found in 45 cases, approximately 1%.

Aschoff gives the same percentage at the Fryburg Clinics. The operative mortality was 4%.

My method of treatment is to give about 5 series, three weeks apart. I am giving a smaller dose than formerly, striving to keep well below an erythema. A dermatitis occasionally happens as certain patients, we believe, have defi-

nite idiosyncrasies to irradiation. We believe that with the smaller divided doses this is less likely to occur. Whenever it does occur, it can be cared for without serious effect to the patient. A certain few suffer from irradiation sickness, which, by the way, is best treated by alkalis, free catharsis and plenty of water. Improvement in many cases starts at once, but in some cases it may be delayed. The tumor begins to shrink after the second or third series. Menorrhagia may increase at first but soon usually returns to normal and ceases. Hot flashes begin and the menopause takes place. In most cases the menopause is less trying and has fewer nervous symptoms than the normal menopause.

Summary: Judging by our results in over 300 cases, we feel that Roentgen therapy has a definite field along side of surgery, in the treatment of the myomatous uterus. There is no mortality in properly selected and properly treated cases. The patients are not obliged to change their mode of living or give up work, and their efficiency is markedly increased, due chiefly to the checking of the hemorrhage with temporary or complete artificial menopause and reduction of the tumor mass. Any complications which may arise can be intelligently and successfully cared for, without serious effects on the patient.

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CHILD LABOR ABROAD

ELEVEN foreign countries have at least a 14-year age minimum for boys and girls going to work, while the United States has no national minimum, according to the report of the House Judiciary Committee recommending the passage of a child-labor amendment by Congress. Only a few States prohibit night work for both boys and girls under 18, but at least 14 foreign countries do so. China has an 8-hour day for children under 17 and India a 6-hour day for children under 15. The United States has no national law on this subject; 11 States permit from 9 to 11 hours a day for children under 16 and one State places no limit at all upon the hours a child may work.—Children's Bureau, U. S. Dept. Labor.

Radium in the Treatment of Non-Malignant Diseases of the Skin

BY FREDERICK S. BURNS, M. D.

AFTER this Society had paid me the honor of asking me to read a paper on the use of x-ray and radium in non-malignant disease of the skin, consideration of the prospective paper led me to the opinion that the inclusion of x-ray therapeutics would inevitably involve a paper of greater length than is appropriate to the occasion; moreover, the use of x-rays in skin diseases is now a ripe subject, it already possesses a voluminous literature and its present status is well formulated in standard text books, so that to review a subject already ably presented by many would be a needless redundancy.

The use of radium in non-malignant skin disease, however, is still a theme with a large field ahead for development and the present status of therapeutic indication and technique is far from crystalized; and even a cursory examination of the subject should satisfy one that subtraction of malignant disease from participation in the field of radium therapy of cutaneous disease yet leaves an extensive and promising domain for work.

It is not the intent of this paper to give a discourse on the history and physics of radium. This purely scientific side of radium has been dealt with by physicists and the facts concerning radioactive elements, so far as known, are best read in their words. Nevertheless, in order to correlate the peculiar properties of radium radiations and their effect on living tissues to their practical use on the skin, one may be allowed to refer to the essential peculiarities of radium activity and to their bio-chemical reactions.

When beta or gamma rays impinge on matter, secondary radiations are produced which vary with the density of the obstructing material and the intensity of the primary rays. Beta rays give rise to secondary gamma rays which in turn produce tertiary beta rays. Primary gamma rays produce secondary beta rays of marked penetrating power. The production of secondary rays in tissues is thought to be the origin of the biologic effect of radioactive energy. Beta and gamma rays possess wide variations in their penetrating power. The index of absorption of these rays by different metals has been quite accurately computed. Colwell and Russ have also determined that the intensity of hard beta rays is reduced to about six per cent of the initial value after passing through one centimeter of epithelial tissue.

As a general rule, the absorbing power of a given substance for different rays increases in proportion to its density. The intensity of radiation is further reduced by distance, in accordance with the inverse square law, i. e., doubling the distance reduces the intensity by one fourth.

These facts provide the physical basis for filtration by means of which a selection of rays for superficial or deep action is possible. Filtration is of prime importance in radium therapy of the skin: for not alone is the amount of radium used a factor but, also the quantity and quality of radiation that actually penetrates diseased tissue. For it is evident that only absorbed rays can exert biologic action.

The skin requires radiation for both superficial and deep effects. On account of the high percentage of soft beta rays from unfiltered surface applicators, such rays are employed for superficial effects only in processes with slight thickening. In order to influence pathologic conditions involving a depth of one centimeter or more, filtration is requisite that superficially absorbed rays may be eliminated and also in order to utilize the more penetrating ones. Without this filtration, the upper strata will be dosed with soft beta rays before the desired amount of hard rays can be absorbed by deeper structures. In lesions of greater thickness than one centimeter, or in those situated more than one centimeter below the surface, gamma radiation should always be employed.

By proper filtration all beta rays can be removed and a homogeneous gamma radiation be obtained. Filtration in this manner gives a quite uniform intensity of action for a distance of several centimeters.

Broadly speaking, all of the biologic effects of radioactive substance, when applied externally, are due to radiations and are manifested by disturbances termed reactions.

In the use of radium for non-malignant diseases of the skin constitutional reactions do not occur, for the reason that only small amounts are required.

Wickham and Degrais were the first to point out that changes in vital tissues may take place by the surface application of radium without the supervision of visible irritation. Hence, this action has been called selective. Inasmuch as all layers of the skin are affected to some degree, the term differential has been proposed by other writers to indicate that the energy of radium affects some tissues more than others.

It has been suggested by Colwell and Russ, however, that the tissue irradiated is of as much importance as the rays, and these authors have proposed the term selective absorption, this term implying that certain structures absorb radium rays more than others, i. e., the more the rays are absorbed, the more the tissue is affected. In general highly differential structures are more sensitive to radium than connective tissue, and pathologic embryonic structures react more sensitively than fixed normal ones.

Selective action, therefore, may be defined as that response by tissues to radium whereby retrograde metamorphosis may be induced in one tissue without such change in others.

The term selective reaction means that under the influences of radium abnormal structures may be caused to undergo retrograde change without visible appearance.

The range of biologic action of radium extends from stimulation to destructive necrosis. It is at present thought that increased metabolic activity by stimulation can, by over stimulation, produce necrosis through exhaustion. Cells most susceptible to such destruction are embryonic cells, endothelial cells, and cells undergoing rapid division, e. g., those of malignant disease.

In the human skin the cells of the germinal layer, hair papillae, the sebaceous and sweat glands, the endothelial cells of blood vessels, and fixed connective tissue cells are radiosensitive; while the non-nucleated elements, as the hair, and elastic and collagenous connective tissue, are only slightly susceptible.

Histologic changes in sensitive tissues consist essentially in nuclear swelling and hyaline degeneration, with early and persistent inflammatory reaction, seen mainly in the papillary layer and consisting of perivascular thickening and oedema.

In passing it may be noted here that direct bactericidal action on bacteria in tissue by radium, without serious damage to the tissues, cannot be obtained.

According to MacKee, in those cutaneous diseases amenable to irradiation, the therapeutic effects are explainable probably through inhibitory action on cell division. Highman and Rulison have also made an interesting contribution to this point, offering explanations based on the histopathology of various dermatoses and, although their paper dealt primarily with x-rays, much of it applies to radium as well.

Histologic changes occurring in the skin from irradiation have been described by Dominici, Bareat, Halkin and others. Dominici and Bareat have described their investigations quite accurately. These authors made their investigations with six mgm. of radium bromide contained in a varnish plaque. In the first series of experiments no filter was used; the radiation consisted, therefore, of mixed beta and gamma rays. Ten applications of five minutes each were given on successive days, guinea pigs being used. Reaction appeared ten days later, consisting of erythema followed by ulceration and crusting. The crust came off between the fifth and sixth week and the healed area appeared as a depigmented, smooth, supple scar. Examination of the radiated tissue ten days after exposure showed evidence of inflammation. The nuclei of the epithelial cells were enlarged and intercellular oedema was present.

After thirty to forty days two phases were noted: first, that of embryonic regression and, later, that of fibrosis. During the first phase the epidermis was restored, but the hair follicles and glandular structures were permanently destroyed. The corium had lost its normal appearances and connective and elastic tissues were replaced by many connective tissue cells. Smooth muscle fibres and small blood vessels underwent similar regressive changes to embryonic type. In the second phase, fibrous connective redeveloped. Formation of the fibrous scar differed, however, from usual sclerotic tissue. From normal areolar tissue it was distinguished by regularity of the connective tissue bundles and by the forming of lines parallel with each other and with the surface. From the usual cicatrix, it differed by marked regularity of the scar tissue and by absence of fibroid perivascular rings and vascular dilation. After seven months the connective tissue was mainly replaced by cellular elements, but the same regularity and parallel arrangement remained.

A second series of experiments were carried out with the same amount of radium (viz., 6 mgm.) screened with five mm. of silver which filtered out ninety per cent of the hard beta rays, making gamma rays responsible for the changes. Fourteen hours after exposure there were found an enlargement of nuclei of the cells of the epidermis and congestion in the corium. After three days there was a superficial but temporary destruction of the epidermis. The corium displayed changes not differing from those occurring after an exposure of fifty minutes to the unscreened radium.

From these experiments the following practical inferences may be drawn: first, that by accurate filtration the effects of either beta or gamma radiation may be utilized; second, that for superficial action on the skin beta rays exert the chief effects; third, that whenever gamma radiation is desired, the inflammatory and destructive activity of beta rays should be eliminated completely.

Of benign tumors of the skin removable by radium the following are at present recognized as the most important: keloids, vascular and pigmented naevi, lymphangiomas, benign cystic epitheliomas, synovial cysts and rhinoscleroma.

Irradiation of keloids, keloidal scars and cicatricial bands gives excellent results not only for cosmetic effect but for the more important relief of annoying, redundant thickenings and contractures which may cause all degrees of impediment to motion. The influence of radium and x-rays, under given technique, on these conditions seems to be identical. The use of radium is best restricted to small keloids and bands of scar tissue, for the reason that x-rays can be applied to much larger surfaces. MacKee, who has had wide experience in the use of both radium

and x-rays, has not observed any difference in their action on keloids. On the other hand, Simpson, Abbe and others favor the use of radium in the treatment of keloids over x-rays.

An important point in the treatment by irradiation of all keloids is to establish the diagnosis and to undertake treatment as early as possible in the formation of the growth.

Depressed scars, e. g., such as those caused by varicella cannot be removed by radium.

The technique of treatment of keloids considers mainly the size and duration of the lesion. Of first importance is the necessity for irradiating keloids to the extreme depth of their bases. Treatment of a keloid should be regarded as complete only when no palpable thickening remains. For small keloids, one quarter or one half strength flat applicators may be used. Screened with one tenth mm. of lead or four tenths mm. of aluminum applied next the skin, exposure of two to four hours may be given. In children this dosage should generally be reduced one half.

Usually after the removal of keloids by radium the skin is soft and elastic, and shows only a smooth atrophic surface. Subsequent telangiectasis is avoided by proper screening.

Vascular naevi as a class yield well to radium. However, of the haemangiomatous birth marks the flat port wine stain is the most difficult in which to obtain satisfactory cosmetic appearances. Small port wine marks may be removed with one quarter or one half strength applicators with light screening of one tenth mm. of aluminum. It is difficult to treat larger lesions of this type evenly with radium, and the edges of the applicators are apt to leave markings difficult to avoid even by the most careful overlapping of the edges. Better results in the large port wine naevus are obtained with the water cooled ultra violet ray lamp.

The group of cavernous angiomas give especially satisfactory results under radium. In these the selective action of radium is necessary. One half and full strength applicators may be used screened with one tenth mm. of lead with exposures of one to two hours; the dosage depending on the thickness of the vascular tissue to be broken down.

In cavernous tumors with great redundancy of tissue, Wickham and Degrais recommend crossfiring by insertion of needles within different portions of the growth.

The deeper angiomas require considerable gamma radiation to bring about their involution and, for this type, radium in tubes, radium emanation or full strength applicators should be employed, filtering out at least fifty per cent of hard beta rays, either by brass or lead filters or by metallic filters combined with distance filtration.

Excepting port wine marks, as mentioned above, treatment of vascular naevi by radium at present gives results superior to any other

method. Most writers agree as to the excellent results obtained in vascular naevi; and MacKee, who always balances carefully x-ray versus radium, advises radium in this lesion.

On pigmented naevi radium has no selective action. Their removal by radium is consequently through the caustic and exfoliative effect of the softer beta rays. Being situated superficially in the skin, rays of slight penetration only are required and, of these, small amounts suffice.

With care, excellent results can be obtained in both small and large pigmented lesions. Minute pigmented naevi are best removed by other methods, such as freezing by liquid air or carbon dioxide and by electrolysis.

In the treatment of pigmented naevi by radium an average dose of two to three mgn. hours screened with rubber only is a safe and usually successful technique. As in the treatment of larger vascular naevi, it is necessary to observe great care in overlapping, in order to avoid remaining pigmented lines.

Lymphangiomas,—tumors that have been notably stubborn to all other methods of removal, yield well to radium. Lymphangioma cavernosum, because of the greater depth of tissue, is more difficult to destroy than lymphangioma circumscriptum, a comparatively superficial growth. Simpson, Abbe and MacKee have reported cases of both types treated by this means. The writer has succeeded in destroying six examples of the circumscripted variety. The method of treatment is similar to that for cavernous haemangiomas.

Multiple benign cystic epitheliomas are lesions of considerable interest to the dermatologist because of their usual situation on the face, their disfiguring appearance, and, further, on account of the difficulty in destroying them without replacement by cicatrices almost as unsightly as the growths themselves. To call radium a panacea for this affection is scarcely an exaggeration, for it accomplishes their removal in almost miraculous fashion and with practically no scarring.

Cases of synovial lesions of the skin cured by radium have been reported by several writers. These lesions have been difficult to cure by surgery, cauterization or electrolysis, so that to be able to remove them by radium is a most acceptable aid. Ormsby and Sutton mention good results from the irradiation of these cysts.

It is of interest to the writer to report here the cure of three small wens by radium. The content of the cysts was first evacuated and the surface then treated with ten mgn. hours screened with four tenths aluminum.

There is a group of affections that for the purposes of this paper may be classed as of inflammatory and uncertain etiology and are symptomatically healed by radium.

Lupus erythematosus has always been a difficult disease to manage therapeutically and the

legion of remedies recommended for its alleviation is an almost certain index of their inefficacy in general. Of late, however, two remedies have become outstanding in the treatment of this affection, viz., carbon dioxide snow and radium. The use of these agents is confined strictly to the fixed, or discoid expressions of lupus erythematosus.

Radium has become a valuable method of treating lupus erythematosus and many writers have reported favorable results from its use. Simpson has reported fifty cases of the discoid type, all more or less benefited. The writer is able to report twenty-seven cases treated by radium, in all but five of which the lesions healed. Tendency to recurrence, however, is common and irradiation appears to exert no influence on the course of the disease.

In psoriasis, lichen planus and chronic eczema, radium finds a limited field of usefulness.

Small, isolated papules of psoriasis, especially those situated on exposed surfaces, can be healed readily. The dosage should not exceed one to two mgm. hours with rubber screening only.

Small areas of corresponding size of chronic eczema and lichen planus are also healed readily; a similar dosage to that employed in psoriasis being used. But on the general course or cure of these affections radium has no influence.

Superficial hypertrophies of the skin curable by radium are keratosis senilis, verrucae, callosities and, in some instances, clavi.

Of skin affections, exclusive of malignant disease, radium in the removal of keratosis senilis probably finds its most important place. For the cure of these potentially malignant lesions radium is little short of magical and the cosmetic results after healing are equally satisfactory. In order to avoid undue atrophy and subsequent telangiectasis only small amounts of radium should be used.

In the writer's experience of over a hundred cases of keratosis senilis treated with radium, a safe and efficient dosage is two to five mgm. hours with rubber screening. Following the reaction, the keratosis is exfoliated and spontaneous healing ensues.

The dangerous and painful keratoses that develop in atrophic skin resulting from x-ray dermatitis will almost always disappear under the action of the beta rays of radium. MacKee, who has had wide experience as a roentgenologist as well as in the use of radium, refers to his gratification in having removed by this means the keratoses from the hands of a number of pioneer x-ray workers. Toussey, Abbe, Degrais and Belot speak with equal interest of the value of radium for x-ray keratoses; and the latter also refers to the cure of several epitheliomata by the same means.

The writer has treated seven cases of x-ray

keratoses, all of whom were physicians excepting one, who was an x-ray technician. The lesions occurred on the hands and face. So far as is known all keratoses treated were healed.

The phenomenon of cure of keratoses due to radiodermatitis by radium has been referred to as an apparent paradox; an appropriate term, for the situation is only apparent, not real. In fact, the situation is the same whatever the cause of the keratosis, whether due to physical or chemical agents. Cells are compelled to adapt themselves to new conditions and, in so doing, they take on new peculiarities and power of independent growth.

Fundamentally, a pre-epitheliomatous keratosis is the same whether due to x-ray, sunlight or other causes promoting degeneration. If radium can cure keratoses and early cutaneous epithelioma the result of actinic rays, one may assume that it may be equally efficacious in similar lesions caused by the results of x-ray exposures.

On account of the peculiar atrophy resulting from radiodermatitis, a note of warning should be given with reference to the treatment of accompanying keratoses. Soft beta rays and small dosage should be given, on an average about two thirds the amount that would be used in an ordinary senile keratosis.

As clavi and callosities consist mainly of epidermic thickening they can usually be removed by soft beta rays.

Because of their papillomatous nature and the discomfort and inconvenience they cause, verrucae are frequently an affection of importance. Plantar warts in particular often occasion pain and impediment to walking. Radium serves as a very successful agent in removing all varieties of warts. Small filiform warts and multiple flat warts, however, are better destroyed by electro-dessication for, by this method, many lesions may be removed at one sitting.

As an antipruritic remedy radium has been used with some success in localized itching of the anus and vulva. In such local pruritus radium has a similar effect to x-rays, but with the disadvantage that affected areas cannot be as completely radiated as by the latter except at the expense of considerable time.

It is worth while to mention the use of radium for the removal of superfluous hair only in order to condemn it. The possibility of producing atrophy and telangiectasia of the skin is scarcely justifiable for a condition of purely cosmetic importance. Better results, without danger, can be accomplished by electrolysis in the hands of a skillful operator.

Although the chief interest of radium therapy of the skin is in the treatment of malignant disease, nevertheless it possesses a field of usefulness in other dermatoses which has gradually developed to a point of importance.

Radium therapy of the skin demands two essential qualifications: first, the training of a dermatologist; second, special training in the technique of radium as applied to the skin.

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X-Ray and Radium in the Non-Malignant Diseases of the Eye

GEORGE S. DERBY, M. D.

My part of this symposium will be very brief because there is but little to say in regard to the use of x-ray and radium in non malignant diseases of the eye and adnexae. With the efficient assistance of Dr. J. H. Waite I have been over the literature for the past fifteen years and as my own personal experiences have been small I shall summarize the experience of others.

It is not surprising that new and potent agents like x-ray and radium should have been received with enthusiasm in ophthalmology and that great results should have been expected.

I will give you a list of some of the various diseases of the eye and its appendages in which good results have been claimed. Pterygium, episcleritis, glaucoma, interstitial keratitis, corneal ulcers of all kinds, corneal scars, cataract, trichiasis, blastomycosis of the lids, myopia, detachment of the retina, trachoma, tuberculous, vernal conjunctivitis, xanthelasma of the lids, vascular tumors, naevi, and the various forms of angiomas, these and others.

To read the literature one would think that we have here a cure for all diseases. Unfortunately the later results do not bear out the claims of these earlier contributions and now it seems probable that radium and x-ray are only useful to a very limited extent. The situation is, however, complicated in that the literature is sadly lacking in details of technique. Many articles state that x-ray or radium was used but the method is not described. In other articles the most diverse methods are employed and in but a few is a really satisfactory description given.

Before coming to the positive results I wish to refer to two classes of cases which are negative. Trachoma is a chronic contagious disease which affects the conjunctiva of the eyelids; it is characterized by the formation of numerous lymphoid follicles under the epithelium which project from the surface of the conjunctiva looking like grains of broiled sago, there is an extensive lymphocytic infiltration of the parts of the conjunctiva involved, fibrous tissue is laid down and scarring takes place. The upper part of the cornea in contact with the lid becomes involved, follicles form on its surface followed by small ulcerations, blood vessels grow in and permanent opacification takes place, which may lead to blindness. The disease is very chronic and

leads to severe irritation. It has been known for hundreds of years. The methods of its control are slow, tedious and painful. Small wonder that these new agents were eagerly employed and many favorable reports were issued. Logically it would seem to me that much might be expected from x-ray and radium and I do not feel sure that with better methods of application we may obtain more favorable results in the future. For the present the results are negative as is well shown by May, who carefully treated a series of cases, one eye with radium and the other with the older methods and obtained better results from the latter. Tyrrell reports on the results in (English) the Metropolitan Asylum Trachoma Schools. In fifteen years over seven thousand cases of trachoma passed through these schools. X-ray had been used but it was most difficult to regulate the dosage, radium has been proved unsatisfactory and both methods have been given up.

Cataract. Knowing as we do that opacification of the lens is due to the degeneration of the lens fibres and not to the invasion of cells; it is hard to see how the process can be favorably influenced by radium or x-ray. In spite of this fact a number of writers have reported beneficial results. In this country the principal endorsers have been Franklin in San Francisco and Cohen and Levin in New York. The article of Cohen and Levin is perhaps the best which has appeared. A recent communication from Dr. Cohen reports, however, that he has abandoned the method. I speak of this because the impression has reached some of the profession and the laity that radium may be of value in these cases and we may now say that the evidence is entirely against it.

We come now to the very few conditions where radium and x-ray seem to be of some benefit in the non malignant diseases of the eye and adnexae.

Vernal Conjunctivitis (Spring Catarrh). This is a recurrent conjunctivitis occurring usually in the warmer seasons of the year. It affects young people and gives rise to very annoying symptoms of photophobia, lacrimation, burning and itching of the eyes. In this part of the country the disease usually affects the lids though this is by no means always the case. On evertting the lid we see rather milky looking

polygonal areas of hypertrophied tissue with a purplish tinge; this is especially marked over the upper tarsus, the areas are elevated and fit into each other like tiles in a floor. The conjunctival epithelium is thickened and covers areas of fibrous tissue. Scattered through the lesions are many eosinophiles which may be demonstrated in the conjunctival secretions and scrapings from the conjunctiva. This aids the diagnosis in doubtful cases. The disease affects all classes, is sporadic and non contagious. There is a second type which we occasionally see and which is common in the South in which the lesions occur on the eyeballs surrounding the cornea. Serious complications do not occur but the disease is most annoying and may sap the health of delicate patients. I should think it was about as bad as hay fever. Approaching adult life it usually disappears. From the published reports it would seem that radium and x-ray had been of benefit in a considerable number of cases.

Dr. Waite has collected for me fifty-nine cases published in sixteen different articles. Of these fifty-eight were reported as cures. The best article which I have run across is that of Janeway from the Knapp Memorial Hospital in New York, a hospital with a very high standard. Janeway says a single application of radium is capable of producing improvement approaching a cure. Sometimes a second treatment is necessary. Twelve cases are reported. To apply the radium he used a very thin piece of lead evenly covered with the active deposit from the emanation, the surrounding tissues were protected, the applicator was introduced under the lid. He believes it is better to use the active deposit rather than radium tubes on account of greater uniformity of distribution. This dosage was 200 to 400 mille curies; with applicators of 50 to 100 mille curies the duration of the exposure was only four minutes. His results were excellent. Butler used the element, 45 mgr. for five minutes, 7 mgr. for eight to fifteen minutes in tubes to the everted lids. Shumway 35 mgr. for fifteen minutes, five treatments. Pusey 5 mgr. over the lid just short of contact for thirty minutes, each portion of the conjunctiva getting about ten minutes. Pusey considers x-ray is efficacious. MacKenzie Davidson says "I may say in every case without exception which I have treated with radium the plaques have completely disappeared leaving no scars. I look on radium as a specific in Spring catarrh."

To summarize, although the methods of using radium and x-ray have varied in strength of application and length of time the results are reported as excellent, and it would seem as though in radium we had a valuable agent for the treatment of this very peculiar and annoying disease. Thus although the literature seems to show that radium is successful in this disease yet much remains to be ascertained in regard

to the best method of application, the optimal dose and the number of exposures necessary.

Radium and x-ray are also useful in Xanthelasma of the lids also in the vascular tumors, naevi, angiomas, lymphangiomas, haemangiomas and cavernous angiomas. As this field has already been covered this evening I need not repeat what has been said.

To recapitulate. Radium and x-ray have a very limited use in the non malignant diseases of the eye. They seem only to be of value in vernal catarrh and extra ocular vascular tumors. Further observations are needed to arrive at uniform methods of applications and dosage.

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THE STRENGTH OF THE NATION

THE future strength of a nation lies in its children and is largely dependent upon their wholesome physical and moral development.

The girls of today are the women of tomorrow, and as future mothers their influence will mould growing womanhood and eventually control the destiny of the race. Girlhood can be a most valuable national asset or a great liability. The future womanhood of every girl and the place she takes in the world will depend in large measure upon what we do for her and what we encourage her to do for herself.

The object of the Girl Scout organization is to give girls natural, wholesome recreation, and to establish those habits of mind and body which will lead to healthy, moral and responsible womanhood.—Mrs. William E. Dever.

The Massachusetts Medical Society**PROCEEDINGS OF THE SOCIETY***First Day, June 6, 1924*

The official exercises of the one hundred and forty-third anniversary were begun by the annual meeting of the supervising censors on Friday, June 6, 1924, at the New Ocean House, Swampscott, at 11.30 A. M. Eleven supervisors were present. They discussed the varying methods employed in the different districts in conducting the examination of candidates for fellowship and appointed a committee to make the examination papers for the ensuing year. At twelve o'clock, noon, the Council met in the same room, one hundred and fourteen councilors signing the attendance books. (See Proceedings of the Council.) At two o'clock the Sections of Medicine, Hospital Administration and Obstetrics and Gynecology met in the hotel and at eight o'clock in the evening the Shattuck Lecture was given there by Dr. C. Macfie Campbell on the subject: "Psychiatry and the Practice of Medicine" to an audience of about 400. Following the lecture there was a cabaret supper and dancing.

Second Day, June 7, 1924

Saturday morning at half-past nine o'clock, the three remaining Sections held their meetings in the New Ocean House, Swampscott, namely, Section of Surgery, Section of Tuberculosis and Section of Pediatrics. The programs of all six Sections were published in the official program, which was sent to every Fellow a month in advance, and also in the official organ of the Society, previous to the meeting. The attendance at the different meetings and the officers elected by them for the ensuing year were as follows:

SECTION OF MEDICINE. Attendance 300. Officers for 1925: *Chairman*, Charles A. Pratt, New Bedford; *Secretary*, Henry Jackson Jr., Chestnut Hill.

SECTION OF SURGERY. Attendance 110. Officers for 1925: *Chairman*, Ernest L. Hunt, Worcester; *Secretary*, Ralph W. French, Fall River.

SECTION OF HOSPITAL ADMINISTRATION. Attendance 15. Officers for 1925: *Chairman*, Franklin G. Balch, Boston; *Secretary*, Edmund W. Wilson, Boston.

SECTION OF TUBERCULOSIS. Attendance 50. Officers for 1925: *Chairman*, Henry Colt, Pittsfield; *Secretary*, P. J. Sullivan, Dalton.

SECTION OF PEDIATRICS. Attendance 75. Officers for 1925: *Chairman*, Edmund F. Curry, Fall River; *Secretary*, J. Herbert Young, Newton.

SECTION OF OBSTETRICS AND GYNECOLOGY. Attendance 60. Officers for 1925: *Chairman*, Charles E. Mongan, Somerville; *Secretary*, Frederick C. Irving, Boston.

The annual meeting of the Society was held in the New Ocean House at noon. The secretary read the minutes of the last meeting and they were approved. He made the following statement of the membership for the year closing on that day: The Society had lost, by death, 61: by resignation, 21; by deprivation of the privileges of fellowship, 9, making a total loss of 91. The Society had gained, by restoration of deprived Fellows by the Council, 10; by readmission by the Censors, 2; by new Fellows, 154, making a total gain of 166 and a net gain of 75, thus the membership on June 7, 1924, was 4124.

The President made the following remarks:

It has been a good year for The Massachusetts Medical Society. The great forward movement of scientific medicine today is influencing the practice of our fellows throughout the state. The prevention and control of disease goes steadily on. The dark continent of incurable diseases promises to grow smaller. Joint district medical society meetings bring increased attendance and interest. Clinical meetings at hospitals demonstrate the high quality of work done in these institutions. We were told recently at the New England Health meeting that the family doctor was passing. I live in a town of eighteen thousand people where there are twenty general practitioners doing well. There will be family physicians as long as there are American homes.

In regard to health legislation this year the record is almost a blank. The laws of the Commonwealth protect the property, health and lives of the people. Health laws should stand first in importance and property second. This is not the order recognized by our legislators. The Committee of the Legislature on Public Health failed in its duty this year. At a hearing before Senate Ways and Means the one woman member on the Committee on Public Health said, "we passed the buck." At the beginning of the session the house chairman of the Public Health Committee, a physician, made this statement: "We will not enact any new health laws this year." What encouragement has the legislative committee of the State Medical Society to work in view of this frank statement of the attitude of the Committee on Public Health of the Legislature? What would the lawyers in the legislature say should a similar statement be made by the house chairman of the Judiciary or of Legal Affairs regarding measures before their committees?

Little has been accomplished the last ten years in health legislation. During this time our Society has been fortunate in having presidents who with active legislative committees have given largely of their time to legislative matters. One president is said to have lived at the State House during the session. The resulting legislation does not seem commensurate with the

effort expended by your officers and committees. Our brothers of the bar play a larger part in shaping our state laws. Mr. Thomas C. Proctor, President of the Massachusetts Bar Association, said to me recently: "Our legislative committee looks after legislative matters affecting the lawyers, I have not been to the State House this session."

Lawyers form a large and influential part of the membership of the Senate and House. More physicians of character and ability are needed in the legislature to insure the enactment of wise health laws. I do not suggest that physicians compete with lawyers as to number in the legislature but I feel that a group of doctors ready in debate would give health matters a standing and consideration that they do not hold today. From my experience in the legislature there is no other way to give the health of our people its place as first, all other legislative matters standing second. Who among our fellows will meet this duty to the state: If we do not meet it the Massachusetts Medical Society fails in its obligation to the Commonwealth.

May the fact that it has seemed necessary for the president of this Society to be constantly at the State House during the session of the general court deter some physicians, who would honor the position, from assuming the duties of the presidency?

Connecticut has cancelled the licenses of at least 167 physicians. Massachusetts is far behind in this work of cleaning house. The Board of Registration in Medicine owes a duty to the state to act with promptness and vigor to maintain the high standards of medical practice so long held in Massachusetts.

At the instance of the President the secretary read the following preamble and resolutions: On being put to a vote they were adopted.

WHEREAS: The life and achievements of the late William Crawford Gorgas have been to our Fellows an inspiration to service for humanity, and

WHEREAS: The Gorgas Memorial Institute contemplates the establishment in his memory of a living, working memorial in the form of:

(a) A Research Institute at Panama for the study, prevention and cure of tropical disease, and

(b) The development of a national educational campaign under the supervision of the scientific medical profession for the purpose of improving and protecting the health of people anywhere. Therefore

BE IT RESOLVED: That in consideration of these facts, the Massachusetts Medical Society, assembled at its annual meeting at Swampscott, June 7, 1924, hereby heartily endorses the plan to memorialize William Crawford Gorgas in the manner contemplated by the Gorgas Memorial Institute, not only because it will constitute a worthy recognition of the character and achievements of our late distinguished col-

league, but will be in effect a memorial to the efficiency and importance of medical science in world progress.

The President announced that he had appointed as delegates of the Society to the Massachusetts Central Health Council, Victor Safford and George C. Shattuck. He said that copies of the History of the Massachusetts Medical Society could be purchased in the lobby; that he hoped every Fellow would get a copy in order to help pay the balance of the cost of publishing, if for no other reason. He called a recess at 12.30 o'clock. At one o'clock the annual discourse was delivered by Dr. James S. Stone, of Boston, with the subject: "The Relations of the Massachusetts Medical Society to the Public."

The annual dinner was served in the main dining room of the hotel at two o'clock to 567 Fellows and their guests. The President introduced the following speakers: Dr. Eugene R. Kelley, Massachusetts State Commissioner of Public Health; Rev. J. Edgar Park of West Newton; Mr. Ernest Harold Baynes; Mr. Robert G. Dodge, Counsel of the Society; Dr. Roger I. Lee, and President Emeritus of Harvard Charles W. Eliot. Their remarks were reported in the BOSTON MEDICAL AND SURGICAL JOURNAL of June 19, 1924.

The total registration during the two days of the meeting was 659 Fellows.

Adjourned at 4.15 P. M.

WALTER L. BURRAGE,
Secretary

ADMISSIONS REPORTED FROM JUNE 13, 1923,
TO JUNE 7, 1924

Year of Admission	Name	Residence	Medical College
*1923	Abbot, Edward Stanley,	Boston	11
1923	Achong, Tito Princilliano,	Boston	10
1923	Angell, Worcester Randolph,	Boston	31
1923	Apellan, Albert Suleiman,	Boston	32
1924	Appel, Bernard,	Boston	12
1924	Atkins, Samuel Maurice,	Winthrop	12
1924	Baehr, Frank Herman,	Boston	22
1924	Baker, Max,	Boston	10
1923	Barrett, Raymond Lathrop,	Springfield	17
1923	Barton, Basil Egbert,	Worcester	11
1923	Bassow, George Winthrop,	Athol	22
1923	Benedict, Edward Benson,	Cambridge	11
1924	Bigelow, George Hoyt,	Boston	11
1924	Blackfan, Kenneth Daniel,	Boston	1
1923	Blackhard, William Bradford,	Framingham	25
1923	Blew, Edgar Maule,	Hathorne	33
1924	Bloom, Robert Raymond,	Boston	10
1924	Brusch, Joseph Armo,	South Boston	12
1923	Buck, Robert William,	Wellesley Hills	11
1924	Burgoyne, Roger Merton,	Winchester	10
1923	Butler, Alfred Worcester,	Watertown	12
1924	Butler, Lester Emmons,	Taunton	10
1924	Campbell, Franklin Edward,	Medford	11
1923	Caswell, Walter Wells,	Brookline	12
1923	Cohen, Julius William,	Dorchester	12
1923	Cohen, Louis Morris,	New Bedford	12
1923	Cohoon, Elisha Henry,	Medford	14
1923	Coleman, Daniel Black,	Wellesley	10
1924	Coleman, Joseph Edward,	Worcester	12
1924	Colson, Z William,	Lawrence	12
1923	Condrick, James Francis,	Quincy	12

1923	Corbett, John Robert, Melrose	24	1924	Pothier, Aubrey Joseph, New Bedford	12
1923	Cotting, William Frederick, Cambridge	12	1924	Powers, Richard Thomas, West Springfield	4
1924	Dameshek, William, Boston	11	1924	Reynolds, Francis Albert, Athol	25
1923	Davidson, Percy Bernard, Boston	6	1924	Riley, William Bernard, Lawrence	11
1923	DeLisle, Antonio Daniel, Fitchburg	12	1924	Rittner, Max, Boston	12
1923	Dewire, William Francis, Somerville	12	1923	Robinson, Elliott Stirling Andrew, Jamaica Plain	13
1924	Donahoe, Robert Abbott, Lowell	22	1924	Rood, Manly Bronson, Worcester	28
1923	Donovan, Timothy Stephen, Lawrence	25	1924	Ryan, Robert Raymond, East Weymouth	11
1923	Dowd, Aloysius Francis, Roslindale	12	1923	Sawyer, Herbert Houston, Dorchester	10
1924	Draper, Charles Ransom, Medford	22	1924	Schwartzman, Harry, Dorchester	10
1923	Duff, Paul Harrington, Charlestown	11	1924	Sheehan, John Dennis, Concord	11
1923	Dunphy, John Joseph, Boston	11	1924	Sheehy, Richard William, Winchester	2
1923	Dunphy, Pierce James, Boston	12	1923	Sidel, Nathan, Springfield	11
1924	Evarts, Helen Wardner, Cambridge	6	1923	Simmons, James Greenleaf, Worcester	11
1923	Fallon, John Michael, Worcester	11	1924	Smith, Floyd Reeves, Pittsfield	3
1924	Farnsworth, Kenneth Clyde, Boston	11	1924	Smith, Judson Arthur, Boston	11
1924	Finn, Richard William, Brockton	12	1923	Smith, Roy Welles, Petersham	16
1923	Forbes, Henry Stone, Milton	11	1924	Smith, William Russell, Taunton	12
1924	Giles, Newell Walton, Palmer	22	1923	Snow, Kathlyne Swift, Boston	12
1923	Goldberg, Bernard Isadore, Boston	11	1923	Solomon, Bennett, Springfield	12
1923	Gokey, James Philip, Fitchburg	11	1923	Stapleton, Willard Pierce, Gardner	18
1923	Gorman, John William, Brockton	2	1924	Steinberg, Bernhard, Boston	10
1923	Gosian, Moses, Brockton	12	1923	Stuart, Harold Coe, Boston	17
1923	Gosman, George Henry Rankin, Brookline	19	1924	Tennis, Max, Dorchester	11
1923	Green, Harold Russell, Franklin	12	1924	Thomas, Elizabeth Alice, Northampton	12
1923	Griemard, George Auguste, Fitchburg	25	1924	Thorne, Fred Sanborn, Brookline	11
1924	Griffin, Charles Henry, Boston	12	1924	Thorpe, Franklyn, Boston	12
1923	Hagopian, Michael, Boston	32	1923	Tillotson, Kenneth James, Waverley	22
1924	Halbach, Robert McCulley, New Bedford	6	1924	Tripp, Curtis Carver, New Bedford	23
1924	Hale, Edward Preston, Lenox	21	1923	Vance, Michael Edward, North Attleboro	21
1923	Halloran, Roy Dennis, Dorchester	17	1923	Warren, Shields, Needham	11
1924	Hanigan, Roscoe Serrel Konkling, Quincy	25	1924	Wearn, Joseph Treloar, Boston	11
1923	Harlow, John Stanley, Jr., Boston	11	1923	Wells, Delbert Arthur, Fitchburg	37
1923	Harney, Robert Edwin, Dorchester	12	1924	White, Leon Edward, Jr., Brookline	17
1923	Hartigan, John Joseph, Boston	12	1924	White, William Allen, Jr., Roxbury	11
1923	Hayden, Louis Brooks, Haverhill	12	1924	Wilde, Salmon Perry, New Bedford	10
1923	Heath, Elmer Hincley, Jr., Boston	11	1924	Wilder, Ella Annis, Boston	10
1923	Herrin, Herbert Eliot, Dorchester	12	1923	Williams, Harold van der Elst, Worcester	11
1924	Hiebert, Joelle Carnelius, Boston	10	1924	Williams, Richard Joseph, Lynn	12
1924	Hill, Lewis Brown, Foxboro	8	1923	Winslow, George Edgar, Hyde Park	11
1924	Holt, Earl Kendall, Palmer	26	1923	Wiswall, Edward Holmes, Wellesley	10
1923	Howes, Seth Francis Harrison, Holden	11	1924	Wood, Gilbert Osborne, Framingham	24
1923	Ingelfinger, Joseph, Swampscott	29	1924	Wright, Leslie Hurd, Palmer	22
1924	Isaacs, Raphael, Boston	30	1924	Yaffe, Joseph Philip, Boston	12
1923	Jackson, Howard LaFayette, Springfield	12	1924	Young, Ward, Northampton	9
1924	Kahn, George, Boston	11			
1923	Klein, Bernard Jacob, Springfield	12			
1923	Landry, Leonard Pierre, Jamaica Plain	12			
1923	Lederman, Bernard, Dorchester	11			
1924	Lee, Edwin Delano, Medford	10			
1924	Lee, Frederick Morton, Wakefield	12			
1924	Lee, Grace Daniels Reed, Medford	10			
1924	Leete, Edward Don, Dorchester	20			
1923	Levin, Samuel Max, Brockton	10			
1923	Littman, Clara, Roxbury	12			
1923	Loughlin, John Joseph, Wakefield	10			
1923	Lugitch, Maurice, Boston	11			
1924	Lydon, Cyril Michael, Dorchester	11			
1923	Lynch, Clement, Malden	33			
1923	MacLeod, Harry Found, Dorchester	19			
1924	Macnaughton, Elizabeth, Brookline	23			
1924	Mason, Robert Leonard, Boston	11			
1924	McIver, Monroe Anderson, Boston	11			
1924	McLaren, Alexander Lorne, East Boston	11			
1923	McMillan, Archibald, Lawrence	5			
1923	Merlin, Samuel Abraham, Springfield	12			
1924	Millet, James Alfred Parsons, Stockbridge	11			
1924	Mitchell, Edward Francis, Clinton	11			
1924	Monroe, Willys Merritt, Pittsfield	13			
1923	Morein, Samuel, Fall River	12			
1923	Morris, Ernest Mariett, Fall River	24			
1923	Murphy, William Parry, Jamaica Plain	11			
1924	Nelligan, Thomas Hayes, Pittsfield	11			
1923	O'Connor, Arthur Michael, Lee	15			
1923	Olson, Bertha Catherine, Worcester	12			
1924	Owens, Harold Francis, Springfield	24			
1924	Perkins, Stephen Irving, Boston	10			
1924	Petrillo, Carmen Ralph, Boston	12			
1923	Poland, Flora Mary, Lowell	10			
1923	Ponte, Joseph Perry, New Bedford	25			

*Admitted by the Censors.

Total, 154 + 2 = 156.

KEY TO MEDICAL COLLEGES

- 1 Albany Medical College.
- 2 College of Physicians and Surgeons, Boston.
(Action of Committee on Medical Education and Medical Diplomas.)
- 3 University of Virginia, Department of Medicine.
- 4 George Washington University Medical School.
- 5 Bowdoin Medical School.
- 6 Johns Hopkins University Medical Department.
- 8 Medical College of Virginia.
- 9 Queen's University Faculty of Medicine.
(Action of Committee on Medical Education and Medical Diplomas.)
- 10 Boston University School of Medicine.
- 11 Harvard University Medical School.
- 12 Tufts College Medical School.
- 13 Yale University School of Medicine.
- 14 College of Physicians and Surgeons, Baltimore.
- 15 Baltimore Medical College.
- 16 St. Louis University School of Medicine.
- 17 Columbia University College of Physicians and Surgeons.
- 18 Rush Medical College (University of Chicago).
- 19 University of Pennsylvania School of Medicine.
- 20 Jefferson Medical College of Philadelphia.
- 21 University and Bellevue Hospital Medical College
- 22 University of Vermont College of Medicine.
- 23 Cornell University Medical College.

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| 24 McGill University Faculty of Medicine. | 31 Temple University Medical School. |
| 25 University of Maryland School of Medicine and
College of Physicians and Surgeons. | (Action of Committee on Medical Education and
Medical Diplomas.) |
| 26 Indiana University School of Medicine. | 32 Imperial Ottoman Medical School. |
| 27 Washington University School of Medicine. | (Action of Committee on Medical Education and
Medical Diplomas.) |
| 28 Syracuse University College of Medicine. | 33 Hahnemann Medical College and Hospital, Phila-
delphia. |
| 29 University of Munich, Germany, Medical School. | |
| 30 University of Cincinnati Medical College. | |

DEATHS REPORTED FROM JUNE 13, 1923, TO JUNE 7, 1924

Admitted	Name	Place of Death	Date of Death	Age
1908	Atchison, Charles Moran	Vallejo, Calif.	Sept. 27, 1923	41
†1872	Barnes, Henry Jabez	Northborough	Oct. 20, 1923	75
†1871	Blodgett, Albert Novatus	Boston	July 3, 1923	75
1885	Boardman, William Sidney	Boston	May 5, 1924	65
1911	Bonelli, Raymond Peter	Wells, Me.	Sept. 13, 1923	43
1891	Bowker, Everett M.	Cataumet	Sept. 8, 1923	58
†1871	Bragdon, George Albert	Middletown, Conn.	Mar. 20, 1921	80
1893	Buck, Augustus Walker	Fall River	Apr. 12, 1924	53
1910	Burke, George Herbert	Springfield	Feb. 27, 1924	39
1899	Burke, William Henry, Jr.	Cambridge	Sept. 23, 1923	56
1887	Callanan, Sampson Aloysius	Orleans	July 20, 1923	60
1913	Castleman, Philip	Boston	Apr. 1, 1924	42
1915	Chase, Joseph	Vineyard Haven	Aug. 23, 1923	71
1915	Chronquest, Alfred Peter	New York City	Dec. 31, 1923	39
†1879	Comey, Perley Pierce	Augusta, Ga.	Mar. 10, 1924	72
1897	Connor, Charles Frank	New Bedford	Oct. 1, 1923	50
1906	Conroy, Edward Cornelius	Methuen	July 4, 1923	62
1905	Dacey, Cornelius Joseph	Boston	Oct. 3, 1923	44
†1882	Daly, Bernard Thomas	Roxbury	Feb. 26, 1924	66
†1911	Davis, Charles Allen	Pocasset	Apr. 29, 1924	76
1890	Dehn, Edward William	New Bedford	June 19, 1924	68
1871	Dixon, Lewis Sever	Boston	Aug. 5, 1923	77
1907	Dodge, George Francis	Baltimore, Md.	Apr. 28, 1924	52
†1874	Ela, Walter	Cambridge	Jan. 28, 1924	75
1901	Fair, Robert Patrick	Cambridge	Sept. 15, 1923	53
†1873	Fisher, Chester Irving	Lockport, N. Y.	Apr. 26, 1924	77
1914	Foss, George Herbert	Springfield	Feb. 29, 1924	45
†1881	Gardner, Clarence Rhodolphus	Northampton	Oct. 21, 1923	73
1869	Goss, Francis Webster	San Francisco, Calif.	July 10, 1924	51
†1883	Gruver, Samuel James	Brockton	Feb. 21, 1924	75
1900	Haines, Ignatius	Brookline	Jan. 16, 1924	52
1908	Hamilton, Albert John Adams	Boston	Nov. 7, 1923	43
†1882	Hastings, Judson Worthington	Feeding Hills	July 3, 1923	70
1911	Honelf, James Albert	Boston	Jan. 24, 1924	43
1901	Hubbard, George William	Springfield	Aug. 11, 1923	51
1917	Irving, Harry Washington	Boston	Apr. 17, 1924	44
1887	Jones, Gilbert Norris	Wellesley Hills	Jan. 26, 1924	61
†1896	Langlois, Joseph Augustus	Pittsfield	Feb. 22, 1924	70
1894	Leach, Edward Mortimer	Rochdale	Feb. 1, 1924	54
1877	Leland, George Adams	Boston	Mar. 17, 1924	73
1903	Lincoln, Merrick	Portland, Me.	Sept. 2, 1923	48
1884	Little, William Brimblecom	Lynn	Apr. 30, 1924	54
1901	Lowell, Freeman Lamprey	Arlington	Feb. 21, 1924	52
1923	Mackler, David Abram	Taunton	Oct. 30, 1923	28
†1863	Marcy, Henry Orlando	Cambridge	Jan. 1, 1924	86
1896	McAdams, James Philip	Lowell	Aug. 26, 1923	55
1875	McCormick, Cornelius Joseph	Waltham	Dec. 4, 1923	70
1873	Morris, Michael Augustine	Charlestown	Feb. 18, 1924	72
1899	O'Sullivan, John Joseph	Lawrence	Feb. 17, 1924	52
†1883	Perry, George Lewis	Athol	Jan. 13, 1924	74
1890	Plummer, Edward Marwick	South Boston	Jan. 3, 1924	67
1902	Putnam, Ralph	Roxbury	Oct. 17, 1923	47
1895	Robinson, William Perry	Haverhill	Oct. 31, 1923	73
1882	Ryder, Godfrey	Stoneham	Dec. 28, 1923	69
1894	Smith, Frank Simpson	Pittsburg	Sept. 6, 1923	54
†1887	Smith, Mary Almira	Winthrop	Aug. 10, 1923	73
1894	Stevens, Charles Benjamin	Worcester	May 14, 1924	53
1886	Stevens, Seriah	Roslindale	Apr. 17, 1924	72
1911	Sultor, Henry Albert	South Deerfield	Dec. 2, 1923	44
1881	Titcomb, George Eugene	Manchester, N. H.	Dec. 6, 1923	69
1913	Torrey, Arthur Stanley	Gloucester	Apr. 8, 1924	39

61 Deaths.

†Indicates Retired Fellow.

OFFICERS OF THE MASSACHUSETTS MEDICAL
SOCIETY

ELECTED BY THE COUNCIL JUNE 6, 1924

President: Enos H. Bigelow, Framingham Center.
Vice-President: Ralph W. Jackson, 251 Cherry Street,
 Fall River.
Secretary: Walter L. Burrage, 182 Walnut Street,
 Brookline.
Treasurer: Arthur K. Stone, Auburn Street, Fram-
 ingham Center.
Librarian Emeritus: Edwin H. Brigham, Brookline.

STANDING COMMITTEES

ELECTED BY THE COUNCIL JUNE 6, 1924

OF ARRANGEMENTS

Dwight O'Hara J. C. Rock L. S. McKittrick
 W. T. S. Thorndike James Hitchcock
 E. P. Hayden

ON PUBLICATIONS AND SCIENTIFIC PAPERS

E. W. Taylor R. B. Osgood F. T. Lord
 R. M. Green A. C. Getchell

ON MEMBERSHIP AND FINANCE

D. N. Blakely Algernon Coolidge, Jr. Samuel Crowell
 Gilman Osgood Homer Gage

ON ETHICS AND DISCIPLINE

Henry Jackson David Cheever F. W. Anthony
 W. D. Ruston S. F. McKeen

ON MEDICAL EDUCATION AND MEDICAL DIPLOMAS

C. F. Painter J. F. Burnham A. G. Howard
 R. L. De Normandie H. P. Stevens

ON STATE AND NATIONAL LEGISLATION

E. H. Bigelow E. H. Stevens F. E. Jones
 J. S. Stone T. J. O'Brien

ON PUBLIC HEALTH

Victor Safford Annie L. Hamilton E. F. Cody
 R. I. Lee T. F. Kenney

ON PUBLIC INSTRUCTION

A. P. Merrill Kendall Emerson W. P. Bowers
 J. S. Stone G. C. Shattuck W. H. Robey, Jr.
 R. I. Lee

PRESIDENTS OF DISTRICT MEDICAL SOCIETIES

VICE-PRESIDENTS (EX-OFFICIO)

Arranged according to seniority of fellowship in the
 Massachusetts Medical Society

J. A. Bedard, Essex South.
 C. Morton Smith, Suffolk.
 E. A. Darling, Middlesex South.
 G. W. Rawson, Hampshire.
 J. H. Lawrence, Plymouth.
 C. S. Benson, Essex North.
 D. N. Blakely, Norfolk.
 A. E. Small, Middlesex East.
 B. H. Hopkins, Worcester North.
 W. O. Hewitt, Bristol North.
 G. D. Henderson, Hampden.
 L. R. Bragg, Worcester.
 A. R. Gardner, Middlesex North.
 D. P. O'Brien, Bristol South.
 C. A. Sullivan, Norfolk South.

E. F. Curry, Barnstable.
 F. A. Millett, Franklin.
 J. A. Sullivan, Berkshire.

COUNCILORS 1924-25

ELECTED BY THE DISTRICT MEDICAL SOCIETIES AT THEIR
 ANNUAL MEETINGS, APRIL 15 TO MAY 15, 1924

NOTE.—The initials M. N. C., following the name
 of a Councilor, indicate that he is a member of the
 Nominating Committee. V. P. indicates that a mem-
 ber is a Councilor by virtue of his office as President
 of a district society, and so Vice-President of the
 general society. C. indicates that he is chairman of
 a Standing Committee.

BARNSTABLE

E. F. Curry, Sagamore, V. P.
 W. D. Kinney, Osterville, M. N. C.
 E. S. Osborne, West Dennis.

BERKSHIRE

J. A. Sullivan, Pittsfield, V. P.
 Henry Colt, Pittsfield.
 C. S. Chapin, Great Barrington, M. N. C.
 A. P. Merrill, Pittsfield, C.
 B. W. Paddock, Pittsfield.

BRISTOL NORTH

W. O. Hewitt, Attleboro, V. P.
 W. H. Allen, Mansfield.
 Sumner Coolidge, Middleboro.
 F. A. Hubbard, Taunton, M. N. C.

BRISTOL SOUTH

D. P. O'Brien, New Bedford, V. P.
 F. R. Barnes, Fall River.
 R. B. Butler, Fall River.
 E. F. Cody, New Bedford, M. N. C.
 A. I. Connell, Fall River.
 A. B. Cushman, South Dartmouth.
 D. J. Fennelly, Fall River.
 C. J. Leary, New Bedford.
 W. A. Nield, New Bedford.

ESSEX NORTH

C. S. Benson, Haverhill, V. P.
 E. S. Bagnall, Groveland.
 R. V. Baketel, Methuen.
 J. Forrest Burnham, Lawrence.
 W. W. Ferrin, Haverhill.
 T. R. Healy, Newburyport, M. N. C.
 A. M. Hubbell, Haverhill.
 G. E. Kurth, Lawrence.
 F. W. Snow, Newburyport.
 W. D. Walker, Andover.

ESSEX SOUTH

J. A. Bedard, Lynn, V. P.
 F. W. Baldwin, Danvers.
 J. F. Donaldson, Salem.
 W. K. Foster, Peabody.
 W. T. Hopkins, Lynn.
 P. P. Johnson, Beverly.
 J. F. Jordan, Peabody.
 G. M. Kline, Beverly.
 S. W. Mooring, Gloucester, M. N. C.
 W. G. Phippen, Salem.
 H. N. Sargent, Salem.
 J. M. Trask, Lynn.

FRANKLIN

F. A. Millett, Greenfield, V. P.
 B. P. Croft, Greenfield.
 G. P. Twitchell, Greenfield, M. N. C.

HAMPDEN

G. A. Henderson, Holyoke, V. P.
J. B. Atwater, Westfield.
E. P. Bagg, Jr., Holyoke, M. N. C.
J. M. Birnie, Springfield.
J. L. Bliss, Holyoke.
A. L. Damon, North Wilbraham.
E. L. Davis, Springfield.
H. D. Gafney, Ware.
M. B. Hodskins, Monson.
C. W. Jackson, Monson.
E. A. Knowlton, Holyoke.
A. G. Rice, Springfield.
M. I. Shea, Chicopee Falls.

HAMPSHIRE

G. W. Rawson, Amherst, V. P.
A. J. Bonneville, Hatfield.
J. A. Houston, Northampton.
E. E. McPherson, Belchertown, M. N. C.
E. D. Williams, Easthampton.

MIDDLESEX EAST

A. E. Small, Melrose, V. P.
Robert Chalmers, Woburn, M. N. C.
G. F. Dow, Reading.
Richard Dutton, Wakefield.
C. E. Ordway, Winchester.
R. R. Stratton, Melrose.

MIDDLESEX NORTH

A. R. Gardner, Lowell, V. P.
W. B. Jackson, Lowell.
J. H. Lambert, Lowell.
J. A. Mehan, Lowell.
J. B. O'Connor, Lowell, M. N. C.
T. F. Carroll, Lowell.
T. A. Stamas, Lowell.

MIDDLESEX SOUTH

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BOOK REVIEW

An Introduction to the Study of Secretion. By
SWALE VINCENT. Pp. 168. New York: Long-
mans, Green & Co. London: Edward Arnold
& Co. 1924.

In this short book, which is so interesting that
one wishes it were twice as long, Prof. Vincent
discusses the present knowledge of the funda-
mental processes involved in secretion, both in-
ternal and external. Just as in his book on the
ductless glands, he restricts himself to facts and
does not attempt to establish ideas based on
theories. Consequently, to some readers the book
will seem inconclusive, but to many others it
will come as a great relief from that long line of
books upon the internal secretions in which
fancy and intriguing theories usurp the place of
facts.

To students, both graduate and undergrad-
uate, who are interested in the physiology and
chemistry of secretion, and to those who, appre-
ciating the narrowness of our present knowl-
edge, seek further information, this book will be
of value. It is a well written, timely, and thor-
oughly interesting exposition of a very impor-
tant body function. The bibliography, though
not complete, is fairly large.

Case Records
of the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN
WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY

RICHARD C. CABOT, M.D., AND HUGH CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 10271

An Italian factory operative of eighteen entered March 19 for relief of pain in the back of four weeks' duration.

F. H. and habits. Good.

Industrial history. Before his last work, which was light work making springs, he did heavy work for a year running a drill and exposed to fumes from gasoline machines.

P. H. For years he had had sore throats. He had "rheumatism" in the knees and hips during the past two winters—mild pain on motion without redness or swelling, lasting a week, sometimes recurring after a week or two of remission, and ceasing when his tonsils and adenoids were removed. For three or four months his appetite had not been good. He had palpitation after excitement or quick work and dyspnea after exertion. He had much sour gaseous eructation, some epigastric discomfort and tenderness with no definite relation to meals. After his bowels moved well his stomach felt better or entirely well and his appetite returned. For three nights he had urinated once at night and the urine had been decreased in amount. For two days the urine had looked bloody. Three months ago he weighed 125 pounds, his best and usual weight. He now weighed 113. His bowels had always been markedly constipated.

Records of the Out-Patient Department. October, three and a half years earlier, when he was sent in for tonsil and adenoid operation. History of dyspnea and palpitation on exertion for a year. P. E. Questionable slight cyanosis of lips and ears. Tonsils large, red and spongy. Heart. Heaving impulse in the fifth space. Over mitral area marked diastolic thrill and presystolic roll, also sharp systolic murmur transmitted to axilla. No diastolic over pulmonary area. Cardiac Clinie: Impulse in sixth space sitting. Rough systolic murmur occurring with loud first sound at apex and transmitted. Long diastolic with presystolic accentuation. Second sound almost inaudible at apex. Systolic and diastolic thrills at apex. B. P. 115/75. X-ray. Heart shadow distinctly enlarged. Greatest prominence in region of auricles.

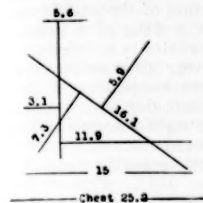
The following January his tonsils and adenoids were removed.

P. I. Four weeks ago he noticed dull aching pain confined to the dorsolumbar region of the spine. He thought it might be due to strain. During the first two weeks his back troubled him only when he moved suddenly or stooped. His face felt hot and he sweat profusely. The pain gradually became more severe and continuous until he was unable to work. He felt weak and dizzy and had occasional headaches. March 7 he went to bed. After he had been in bed a week a physician found his temperature was 103°. The pain had been intermittent, worse on motion, usually dull aching, but occasionally sharp enough to take his breath away, confined to the lower spine with some radiation to the adjacent lumbar region. It had occasionally awakened him from sleep and often prevented his going to sleep. There had been marked sweating during the illness and an occasional chilly feeling. During the past week he did not have a movement for three days, and then only after an enema. He had had an occasional feeling of nausea.

P. E. A fairly well developed and nourished boy with flushed cheeks and hot skin. Throat reddened. Bean-sized cervical glands. Poker back. No tenderness elicited over any vertebra. Alignment appeared good. *Lungs.* Dullness at both bases, with diminished breath sounds. Maximum impulse of the heart in the sixth space in the anterior axillary line, 11 cm. from midsternum; shift in left lateral position about 1 cm. Diastolic thrill at apex. Blowing systolic and rumbling loud middiastolic and late diastolic murmurs at the apex. Blowing diastolic murmur along left sternal border. B. P. 110/48—95/43—120/60. *Electrocardiogram.* Normal rhythm. Rate 90. Partial auriculoventricular block. P-R—22". Slight right axis deviation. Index —19. Wide notched P wave in leads I and II. *Abdomen* held somewhat stiff, otherwise negative. Slight costovertebral tenderness on the left. *Extremities* normal. *Rectal examination.* Prostate small, firm. Secretion not expressed. *Pupils and reflexes* normal.

T. 99.5°-104°, with a terminal rise to 106.3°. P. 75-122. R. 22-36, with a terminal rise to 51. *Urine.* $\bar{\nu}$ 20-72, sp. gr. 1.030-1.015, the slightest possible trace of albumin at one of four examinations, leucocytes at three. *Renal function* 30%. *Non-protein nitrogen* 27.2 mgm. *Blood:* Hgb. 70-75%, leucocytes 20,800-39,000, polynuclears 86-91%, reds 5,248,000, moderate achromia and anisocytosis, tendency toward large polychromatophilic macrocytes, reticulated cells less than 1/2%, platelets large March 26, none April 1. *Wassermann* negative. *Blood culture* March 20, I staphylococcus aureus, II bacillus epidermidis communis. March 26, I no

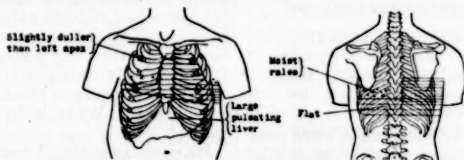
growth, *II* staphylococcus aureus. *Prostatic secretion.* Many luetin bodies, rare leucocytes, no gonococci. *Urine culture,* catheter specimen. A few staphylococci. *Sputum* negative (one examination) for tb. *X-rays, March 21.* No marked change in shape of heart. Slight increase in size. (See diagram.) . . . Sinuses normal. . .



Measurements by X-Ray

Teeth. Considerable area of bone absorption at the tip of a decayed incisor, probably abscess. *March 29.* A vertebra apparently in the region from the seventh to the ninth appeared slightly narrower than the vertebrae above and below, was irregular and appeared diminished in density; but this may have been wholly apparent, because of the shadows of the ribs which lay over its upper and lower borders. In the antero-posterior view there was a slight but rather sharp angulation in the spine laterally, and through the heart shadow was suggested a second shadow of fusiform shape surrounding the shadow of the spine. The intervertebral spaces in this region were preserved. . . . Kidneys, no abnormalities. *April 1.* Stereoscopic plates of the dorsal spine showed the same abnormality of outline of the vertebra and the same shadow within the shadow of the heart.

Orders. March 19. House diet with extras between meals. Force fluids. Sodium salicylate and sodium bicarbonate each gr. xv 5 i.d.



Omit for symptoms of cinchonism. *March 20.* Russian oil 5 i. Fluid extract of cascara 15 minims. *March 22.* Sodium salicylate gr. xv with sodium bicarbonate gr. xv 4 i.d. *March 23 and 29.* Veronal gr. x. Codeia gr. ss by mouth. *March 31.* Digitalis gr. iii every four hours by mouth unless nauseated or pulse below 60. *Morphia* gr. 1/6 by mouth for restlessness. *April 1.* Individual precautions. Digifolin gr. iii with caffeine gr. xv intramuscularly. Oxygen.

The patient was given salicylates until his ears rang. There was no improvement of the pain in the back. The pain in the spine continued. The temperature was not affected by salicylates. The patient complained of pain in the precordia on attempt to move. He had unpro-

ductive cough. *April 1* the chest signs were as shown in the diagram. The abdomen was tense, dull throughout, with bulging flanks and a tender pulsating liver. The ankles were edematous. There was a rough to-and-fro murmur near the apex, perhaps of pericardial origin, although it sounded more like an endocardial murmur. That day the patient died.

DISCUSSION

BY DR. RICHARD C. CABOT

NOTES ON THE HISTORY

His entering complaint gives no idea whatever what is the matter, pain in the back being so common both in severe and in mild diseases.

Chronic carbon dioxide poisoning, which is about all we get from his industrial history, we know very little about. Acute carbon dioxide poisoning of course is a coma, but he certainly did not get that. So that the industrial history does not give us much help.

The removal of the tonsils and adenoids tells us that the joint troubles probably represent an acute arthritis of the rheumatic type, because it stopped when the tonsils were removed. Otherwise we could not tell from the history what it was.

Always be cautious about accepting statements like this about the urine. Two statements of patients I have learned to be most cautious about: the color of the urine and jaundice. If the patient says he has been jaundiced, do not believe it. He probably has been a little sallow. Or if he says his urine has been of an "awful" color, and speaks of it as bloody, we

shall very likely find that there has been nothing but concentration.

The heart examination makes us think of mitral stenosis.

Whenever we are taking X-ray plates of the heart for diagnostic purposes we take them at a distance of seven feet. At seven feet the rays are nearly enough parallel so that there is no distortion. The general rule followed by most of us who are not expert in X-ray work is that the total transverse diameter of the heart must not measure more than half the whole chest diameter. I do not know the measurement of the chest here, but we can easily see that the heart occupies a great deal more than half of it. Beyond that the point that shows even to an amateur like myself is that in the first place, in-

stead of bending in on the left border as it should, there is a shadow in the region of the left auricle which is what we often see in mitral stenosis. There is also a shadow approximately in the situation of the right auricle.

It is a small chest. We thus get an idea of the individual. It is like having a photograph. We see how small this individual is, with a big heart and big auricles. I should not have supposed he would weigh 113 pounds with such a small chest as this.

Presumably he is having a fever, and perhaps also the pain in the back is due to that fever. The commonest of all causes of lumbar pain not of long standing is fever from any infection.

His headaches, weakness, dizziness, sweating, pain in the back, are all probably due to the same infection.

But as we read on we see that this is more pain than we usually get in a patient who has gone to bed from an infection like typhoid or tonsillitis. We now begin to think there must be some local cause because it has persisted and is so severe even when the patient is in bed.

As we come to the physical examination what do we know? We know that three years ago he had mitral stenosis. We know he has a fever. We know that he has pain in the back, and that is all. I have no idea at the present moment what that pain in the back is, unless as I thought first it is due merely to the acute infection which I am quite sure he has on top of his old heart trouble. If he has an acute infection on top of his old one, what is the commonest infection? Acute endocarditis on top of chronic endocarditis. That is all that is in my mind so far.

NOTES ON THE PHYSICAL EXAMINATION

1. "Poker back" means that he cannot bend his back in any direction. That is not in the least characteristic of heart disease, acute or chronic, and ought to mean something else than what I have been thinking of.

2. The diminished breath sounds were probably due to hydrothorax, possibly to a high diaphragm due to some lesion below pushing it up. We cannot tell until later.

3. The impulse of the heart is much displaced; eleven cm. from midsternum in so small a chest is a very considerable enlargement.

4. They are asking themselves the question whether he has an adherent pericardium. Ordinarily a heart will shift more than one cm. when the patient lies on his left side. It will shift two or three. But the absence of shift does not prove pericarditis. If there is a good shift we can say, "Probably no pericarditis"; but many normal hearts, for reasons which I do not understand, do not shift much.

5. The blood pressure measurements both show a little increase of pulse pressure, a little tendency to Corrigan pulse, so that we begin to wonder whether he has not an aortic lesion, re-

gurgitation, as well as the mitral lesion which has been indicated by all examinations. The P-R interval should be twenty; that is why with an interval of .22 the report says "partial block." There is a little lengthening of the interval between the contraction of the auricle and the contraction of the ventricle. The P-R interval (between the contraction of the auricle and the ventricle) is usually a fifth of a second. Even as little as two-twentieths is a definite increase, because this is a very accurate measurement. So there is a slight lengthening of that interval. "Slight right axis deviation" means slight hypertrophy of the right ventricle, which we should get with mitral stenosis.

His temperature was between 101° and 103°, practically never below 101°, without big swings; that is, not a septic temperature but continuous. The pulse is pretty low, 80 to 90, and the respiration, urine and the rest not striking. The urine tests show all normal figures and indicate perfectly normal kidneys.

I do not feel sure of the hemoglobin. One needs considerable experience with the ways of house officers before one can interpret a hemoglobin of seventy. As a matter of fact, seventy is a rare reading. But if he puts down seventy no one can abuse him much, because it is neither high nor low. We get a great many readings of seventy that I am sceptical about. They are usually either one hundred or less than seventy. Seventy is one of the rarest readings that occurs in fact and one of the commonest in the records, and I can explain it only as I have explained it here,—psychologically and not scientifically.

The reds are normal. They are using big words to mean big, off-color cells, stained a purple instead of reddish yellow. All that it comes to is a mild secondary anemia. It makes no difference whether the platelets are large or not. It is perfectly unimportant.

A blood culture is the natural thing to do in such a case. What is bacillus epidermis communis?

DR. RICHARDSON: I never heard of it.

DR. CABOT: These aureus cultures I should think we must take seriously. On two occasions they got staphylococcus aureus. We shall come back to the interpretation of it later, but I think that is a very important fact.

They are looking for a gonococcus endocarditis, but they do not get the evidence of the coccus in the prostate.

I do not think the staphylococci in the urine are enough to put much stress on.

The X-ray plate shows that the total transverse diameter of the heart is fifteen cm. in a chest which measures twenty-five. Dr. Richardson points out what I had missed here, which certainly is interesting,—a shadow inside the other shadow, which in view of his poker back is undoubtedly important. There is nothing which has anything to do with the heart that shows this picture. Fusiform shadows of this

sort come with inflammations, either tuberculous or non-tuberculous. We shall come back to these facts, which are certainly very important, when we sum up the case.

Here is another picture of this shadow, taken I judge from behind. We see it very well here, and it ought to be an inflammatory exudate, probably pus.

The orders are symptomatic except for the digitalis.

Dullness at the apex of the right lung does not mean anything, because we always have it. The diagram shows a large heart, a large pulsating liver, then evidence of edema of the lungs and hydrothorax in the right chest; he had ascites as well as passive congestion of the liver.

DIFFERENTIAL DIAGNOSIS

We have here a young man, a small man, eighteen years old—a boy really—and he has a chronic affection of his mitral valve and perhaps of his aortic valve,—certainly of his mitral. Then he gets a sudden fever, a pain in the back, and comes in here with staphylococcus in his blood, perhaps in his urine, with this extraordinary fusiform shadow about his spine, and with a heart showing the same abnormalities as before.

In addition to acute and chronic endocarditis, which I certainly believe he has, what else? Has he tuberculous of the spine? He may have, for all I know. But it is an extraordinarily acute history, and we know that he has an organism of a very acute infection in his blood. It seems to me perfectly conceivable that he has staphylococcus aureus infection in and about his spine. Staphylococcus aureus of course is not the ordinary organism that we see in acute endocarditis. It is a rare but not at all unknown organism with acute endocarditis.

If we argue on the basis of that staphylococcus, taking those cultures as correct, there are certain things that follow. The staphylococcus aureus has certain places that it is fond of settling: the kidney is the commonest of all places. Staphylococcus abscess of the kidney, if those cultures were correct, is quite a possibility. Another place is the myocardium, the wall of the heart. Many cases of carbuncle die with staphylococcus trouble and abscesses of the myocardium. I never knew, so far as I can remember, a staphylococcus abscess about the spine, but I know no reason why he should not have it.

So we have an old heart lesion of the mitral valve, mitral stenosis and regurgitation. His heart is so large that I think it quite possible that he has also an aortic lesion, which was suggested by the pulse pressure and by one of the murmurs. His acute infection may be all outside the heart, all in the spine, the kidney, and so on, or it may be in the heart and outside the heart both. If it is in the heart then we shall have shown post-mortem an acute endocarditis.

I think that is probable. I think there will be acute endocarditis, because it is so common to have acute endocarditis on top of a chronic one, and because there is so much in the way of thrill in the heart, thrill going very often with acute endocarditis.

As to this condition in the back, the essential thing is, is it tuberculous or is it acute? I do not know how to settle that. It seems to me most probable that it is acute because of the clinical history, because the whole illness is so short. I never knew a boy to die of tuberculosis of the spine so quickly. And while it is true that we do have latent cases of spinal tuberculosis, I never knew a latent case to show such a shadow as that. The latent cases have shown nothing by X-ray.

The rest of the body should show chronic passive congestion, and that is all,—ascites, big liver, congested digestive tract, and so on.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Rheumatic heart disease with mitral and aortic endocarditis.
Subacute bacterial endocarditis?
Tuberculosis of spine?

DR. RICHARD C. CABOT'S DIAGNOSIS

Acute and chronic endocarditis of the mitral and aortic valves.
Staphylococcus septicemia.
Purulent exudate along the spine.
Hypertrophy and dilatation of the heart.
Chronic passive congestion.

ANATOMICAL DIAGNOSIS

1. Primary fatal lesions

Staphylococcus septicemia.
Abscess of prostate.
Phlegmon of paravertebral tissues and spinal column in the thoracic region.

2. Secondary or terminal lesions

Chronic endocarditis of the mitral, aortic and tricuspid valves.
Hypertrophy and dilatation of the heart.
Chronic passive congestion.
Hydropericardium.
Hydrothorax.
Ascites.
Anasarca.
Fibrinopurulent bronchitis with fibrinous casts.

3. Historical landmarks

Chronic pleuritis, right.

DR. RICHARDSON: In the left cubital space were brown-red spots. There was a small amount of subcutaneous fat. The subcutaneous tissues were wet,—anasarca.

The peritoneal cavity contained 2000 c.c. of

clear straw-colored fluid,—ascites. The esophagus, stomach and intestines showed well marked chronic passive congestion,—brownish-red, velvety mucosa, oozing thin bloody fluid.

The liver was thirteen cm. below the costal border; that is well down. In the left mammary line it was eight cm. below the costal border. That is quite far down for that side. The diaphragm was at the fifth rib on the right, at the sixth rib on the left.—a little low.

The right pleural cavity contained about 600 c.c. of thin pale clear fluid, the right 300 c.c.,—slight hydrothorax. The trachea and bronchi contained much muco-purulent material, and besides that there were fibrinous casts, quite long ones, extending down the trachea and primary bronchi into the smaller bronchi,—a fibrinopurulent bronchitis with fibrinous casts. The bronchial glands were moderately enlarged, soft and juicy.

The lung tissue was spongy to leathery, with the peculiar brownish-red color and a moderate amount of the brownish-red frothy fluid—typical of chronic passive congestion.

There was slight hydropericardium, 200 c.c. of clear fluid. The heart weighed 465 grams,—considerably enlarged for him. The myocardium was of good consistence, bluish-brown-red, the color indicative of congestion. The right ventricle wall measured six mm., an increase in thickness of nearly twice, which indicates generally some lesion on the left side and usually of the mitral valve. We also find a thickened wall on the right side if there is anything the matter with the pulmonary valve. The pulmonary valve in this case was negative. The auricular appendages were negative. In mitral stenosis not infrequently we find thrombi in the left auricular appendix. Sometimes a portion becomes free and as a ball thrombus settles down and closes the stenosed opening of the mitral valve with associated sudden death. So far as the cases go here it is rather rare. The columnae carneae were thick. So that we have a thick myocardium on the right, with the columnae carneae thickened, and on the left side a wall eleven mm. thick, which is not indicative of anything one way or the other. It is about the usual thickness, perhaps a little thicker in a patient eighteen years of age whose anatomical characteristics are such as Dr. Cabot described; a small man poorly nourished.

The opening of the mitral valve admitted the tip of the little finger. The cause of that was a marked diffuse fibrosis with thickening and deformity, with a few areas of calcareous change and thickening, and fusion of the chordae tendineae, all of which produced this so-called button-hole mitral. From the insertion of the posterior cusp there was a patch of fibrosis, which extended up along the endocardium of the wall of the left auricle. That is not an uncommon occurrence in these cases of so-called rheumatic heart disease.

The aortic valve circumference was 5.5 cm. We cannot say much about that, one way or the other. It was not enlarged, and from the character of the valve as we saw it it was if anything stenosed. The cusps of the valve showed some irregular fibrous thickening with some decrease in their width and some granular fibrosis along the free margins.

The tricuspid valve measured eleven cm. That is rather small. The curtain of this valve showed a moderate amount of diffuse fibrous thickening with some deformity and some shortening and thickening of the chordae tendineae. The pulmonary valve measured eight cm. and was negative. So that we found the mitral, aortic and tricuspid valves affected and their extent in that order.

The liver weighed 2330 grams. That is moderate enlargement. There were a few old adhesions to the diaphragm. The liver tissue showed chronic passive congestion.

In the lower portion of the prostate there was a small abscess, twelve mm. across. The prostate was otherwise negative.

We did not examine the head. In the thoracic region, from the fifth to the seventh vertebrae, anteriorly, the spinal column presented a flattened firm ridge, which is probably what the X-ray showed. Coming down from that as far as the ninth thoracic and resting along each side of the column there was a fusiform mass which shows in the X-ray. On cutting into that we found purulent infiltrated tissue with some extension into the bodies of the vertebrae in places. Microscopically there were staphylococci, no tubercle bacilli, and the process was regarded as a phlegmon in the paravertebral tissues and extending for a short distance into the bodies of the vertebrae.

Culture from the heart blood showed the staphylococcus aureus, and coverglasses from the pus—the abscess of the prostate and the vertebral phlegmon—showed leucocytes and staphylococci. In none of the coverglasses were tubercle bacilli found. The histological examination showed suppurative inflammation in the region of the phlegmon. A piece of the spinal cord taken at the level of the phlegmon was negative.

CASE 10272

A premature infant one day old was brought March 22.

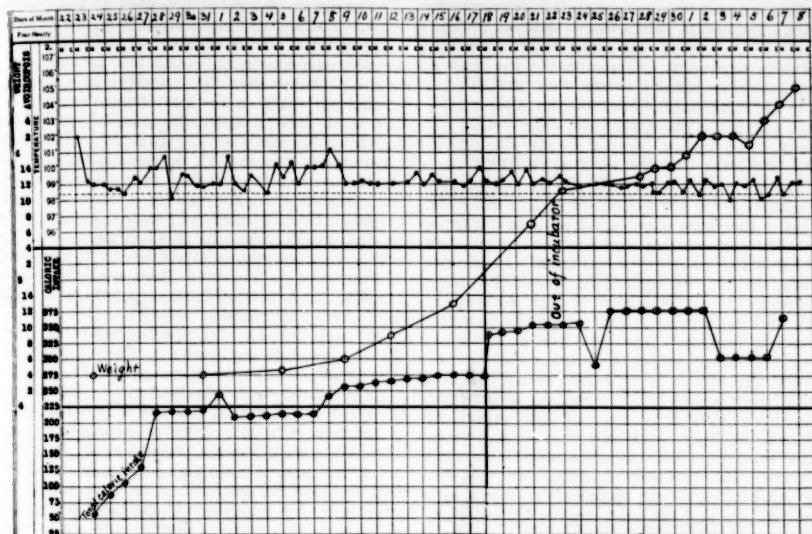
P. I. Her mother was carcinomatous. The baby was delivered by Cesarean section at six or seven months. Resuscitation was difficult. The mother died a week later.

P. E. Complete examination was not done at admission. The heart, lungs, abdomen and extremities were negative.

Temperature, weight and caloric intake are shown in the chart.

The baby was kept in a specially constructed incubator (see illustration). No breast milk

once, later two or three times daily. The stools were perfectly digested. May 8 the baby was discharged weighing 6 pounds 8 ounces and doing well.



was obtainable until the sixth day. The order was, "Start formula when the baby is twenty-four hours old. Use sterile water in the interim if necessary." Feeding was started by the following formula: whey 12 ounces, water 4 ounces, 16% cream 2 ounces, dextri-maltose 1 large tablespoonful. She was given at first one ounce every two hours, twelve feedings, making a total of twelve ounces in the twenty-four hours. She took the feedings well. March 27 she was started on daily feedings of 8 ounces of breast milk with four ounces of the whey mixture. April 5 the formula was changed by the addition of another half tablespoonful of dextri-maltose. April 8 the amount was increased to an ounce and a half at several of the feedings, making a total gradually increasing from 14 ounces April 7 to 18 ounces April 14, the amount of breast milk remaining constant, 8 ounces a day. April 18 the formula was changed to whey 16 ounces, water 5½ ounces, cream 2½ ounces, dextri-maltose 1½ tablespoonfuls, and the total amount increased to 24 ounces. April 23 the breast milk was discontinued and the formula was changed by increasing the amount of cream to 3 ounces. April 26 the schedule was made 8 feedings of 3 ounces. May 6 the formula was made dryco 20 tablespoonfuls, water 24 ounces. The steady gain in weight is shown in the chart. The bowels moved regularly, at first



Incubator for premature infants.

DISCUSSION

BY DR. FRITZ B. TALBOT

It is to be noted that a complete physical examination was not done when the baby was first seen. Premature babies are so delicate that it is wise not to expose them any more than is absolutely necessary. Consequently the first examination is usually made very sketchily, to rule out congenital abnormalities and to show that the principal organs are functioning normally. It is then possible to outline the care and treatment that the baby should receive.

The premature baby lacks one to two months' preparation for the exigencies of life. All treatment is therefore based upon an attempt to imitate the environment that the baby would have had if it had gone on to full term. In the first place its body temperature should be maintained at the uniform level of 98.6° Fahrenheit. The heat regulating apparatus of the new-born infant is not thoroughly developed at birth, and in a premature infant it is not developed for several weeks after birth, consequently it is even more important to prevent chilling in a premature infant than it is in a full term infant, because if the body temperature is allowed to become subnormal all the normal processes are depressed and the body functions are not carried on in the normal manner, the digestion is handicapped, and the baby is more susceptible to infection. Many methods are used to maintain a normal body temperature. They all depend upon the general principle of keeping the baby in a uniform temperature sufficiently high to prevent loss of heat from the body.

The incubator used in this hospital consists of a water jacket heated from below by an electric heater. The heated water rises in the jacket, keeping the heat of the system at a uniform temperature. This is measured by a thermometer (T, Plate I) inserted in the top and reaching into the water. The height of the water is measured in a gauge (G) at the end of the crib. The baby lies inside on a mattress which is not in contact with the side or floor of the crib; consequently the baby is in no danger of burns. The temperature is so regulated that the baby's body temperature remains normal or slightly above normal. At first slight changes in the surrounding temperature make the body temperature of the baby fluctuate. This is shown on the accompanying chart. It is much better for the body temperature to be above than below normal. The baby never dies from being kept a little too warm, but often dies from exposure. In the home the same results can be obtained with a padded clothes basket and hot water bottles.

The second most important factor is to keep infection away from the baby. It should be kept in a room by itself, as this baby was. All persons who have any suggestion of infection of any sort should be kept away. Respiratory in-

fections are especially serious in these infants.

In the third place, the baby should be kept as quiet as possible and handled only as much as is necessary to keep it clean and to feed it. The question of light is disputed at the present time. The absence of sunlight is known to have some relation to the incidence of rickets, which is not uncommon in premature infants. It seems probable then that sunlight has been excluded too much in the past from these babies, and at an early moment they should receive the benefit of the sun's rays. It is very difficult to know when this should be commenced, but in general it may be said that they should receive some sunshine at the end of a month, if not earlier. This statement of course does not apply to all times of year and to all climates. In the winter it is sometimes impossible to do this, and of course it is accepted that sunlight which comes through window glass does not contain the rays which heal rickets.

The methods of feeding premature infants are of the greatest importance. They should receive human milk when possible. In private practice this is easily obtained at the Wet Nurse Directory. In hospital practice it is not so easily obtained. In this instance it was given as soon as it was obtainable, which was on the sixth day. The baby should not be overfatigued by working hard for its food. The food should be given in such a manner that the baby can get it with the least possible effort. At first it is often necessary to feed with the medicine dropper. Later a Breck feeder may be substituted, and later still, as he gets stronger, the ordinary bottle may be used. It is sometimes difficult to decide when is the best time to allow the baby to nurse from its mother's breast. A very workable rule is to say that the baby can be put to the breast when it weighs six pounds. Usually it is better to start with one breast nursing a day and to increase the number as the baby becomes stronger. The harder the baby has to work for his food the fewer calories are left for growth.

When a formula is used it is usually best to give a very weak mixture at first and then gradually strengthen it as the baby's digestion improves. In this instance a mixture of whey, cream and malt sugar was used and agreed very well. This infant was fed every two hours, twelve feedings, and progressed satisfactorily.

There is a discussion as to whether long or short intervals are desirable in these babies. Some schools teach feeding only once in four hours, on the theory that if the stomach is not completely emptied before the next feeding enters indigestion will commence. This however does not seem to work out in practice. It is the rule in this clinic to commence all babies that weigh under six pounds on two-hour intervals, usually ten feedings in the twenty-four hours; babies that weigh from six to seven and a half pounds on two and a half hour intervals; those that weigh from seven and a half to nine pounds

at three-hour intervals; and those that weigh more on four-hour intervals.

It has been found that in this clinic a premature baby will not gain until it is having 200 or more calories in the twenty-four hours.* It does not make much difference in what form the food is so long as it is well digested, but the baby must receive over 200 calories before it will constantly gain. This baby made slight gain when it had 210 calories, did not gain rapidly until it was having between 250 and 275 calories. This is shown on the chart. When the baby was able to receive and digest 350 calories the gain was very rapid indeed. Certain babies seem to be able to digest as much as is given to them, and other babies can digest only small amounts of food. In the cases of low tolerance it does not pay to put more food into the gastro-intestinal tract, because it will only add an extra burden on the digestion and will not do any good. If the tolerance or limits of assimilation are below 200 calories gain in weight cannot be expected, because not enough food is absorbed to supply the caloric needs of the basal metabolism and muscular activity and also to leave an excess for growth or to build new tissues in the body. In feeding premature babies precautions should always be taken not to overfeed them, and in this respect the wise physician very carefully and slowly increases the amount of food that the baby receives. Usually however the amount may be increased quite rapidly if the body temperature is kept normal, if the baby is not disturbed, and if it does not become infected by the milk or its attendants.

The premature baby should never be put into a bath during the early weeks. The exposure incident to this often results in a subnormal temperature and does much harm. Usually it is best at first to oil the baby every other day in a room in which the temperature is about eighty-five degrees Fahrenheit, exposing as little of the body as possible. He can be kept perfectly clean in this manner. When he is soiled he can be cleaned with little or no exposure. The number of oil baths can be increased as the baby gains weight and can be given daily when he weighs about five pounds. After the baby weighs six to six and a half pounds a water bath can be considered, and if he is strong one water bath a week may be commenced. If the reaction is good and the baby is strong enough to keep himself warm by wriggling and crying the bath does not do any harm. But if he becomes cold, blue, or pale the baths should be omitted and not resumed until he weighs seven or more pounds.

The treatment of the premature baby is preventive treatment, and success depends upon the efficiency of the attending nurse and upon the success of the physician in obtaining human milk. When all the requirements mentioned

above have been met the prognosis usually is very good. It must be borne in mind, however, that during the first three weeks of life sudden death occasionally occurs. It is not certain in all instances what the cause is. Often it is due to carelessness and exposure. Occasionally it is due to a large thymus.

CASE 10273

An American schoolgirl of sixteen entered April 1 for relief of pain in the right lower quadrant of two weeks' duration.

F. H. Good.

P. H. She had measles, whooping cough, chickenpox, and pneumonia in infancy, jaundice at ten, an occasional sore throat. For the past few years her bowels had been constipated, requiring occasional catharsis. During the past year she had sometimes vomited after eating. Her catamenia started at thirteen, stopped for a while, then was regular until the past six months, when she had occasionally had two periods a month; no period in January. For two months she had had slight leukorrhea. She had lost two pounds in the past year.

P. I. For two weeks she had had every day several attacks of severe sharp non-radiating pain in the right lower quadrant lasting from a few minutes to all day, often waking her at night and making her cry out and double up. There was no relation to meals. Her appetite had been poor since the onset. Two weeks ago she was nauseated and vomited. There was tenderness in the right lower quadrant upon pressure or exertion.

P. E. Negative except for *abdomen*. In the right lower quadrant was moderate tenderness with some spasm, apparently largely voluntary. Rectal examination unsatisfactory, as the patient would not cooperate. No masses or tenderness made out.

Before operation T. and R. normal, P. 91-90, urine and blood not recorded.

April 2 operation was done. The patient did not void after it, was very uncomfortable, and had to be catheterized twice. The night of April 3 the temperature was 104.5°, and afterwards ranged from 102.2° to 105°, the pulse from 117 to 192, the respirations from 15 to 42. There was some tenderness in the lower abdomen and the right flank. The patient had nausea and vomiting. She sat up in bed. She took nothing by mouth or by rectum. Morphine was given every two hours, and fluid subcutaneously. April 4 she felt better and did not look very ill. There was less tenderness in the abdomen and none in the flanks. Slight distension however persisted next day. She passed gas and had audible

*Talbot, Sisson, etc., Amer. Jour. Dis. of Child., Aug., 1923.

peristalsis. April 6 she vomited. The abdomen was quite distended and the heart pushed up. Colonic irrigations were given that day and the next two days with good gas and fecal results. April 7 the abdomen was markedly distended. Gastric lavage was done with the return of thirty-two ounces of dark foul material, guaiac strongly positive. The patient seemed much better for a while after this, and had less distension. A blood culture showed streptococcus hemolyticus. April 8 she was much worse, showed evidence of circulatory failure developing rapidly, and died.

DISCUSSION

BY DR. EDWARD L. YOUNG, JR.

I wish the appendix had been tucked up in the left upper quadrant, because anybody who has a pain in the right lower quadrant promptly brings into the mind of the surgeon, "Isn't it an appendix that is making the trouble?" This is not the typical story of appendicitis, and we know that down in the right lower quadrant there are a good many things that can give this story.

The irregularity of periods brings up the question whether this may be tuberculosis. Of course tuberculosis starting in the tubes is more likely to cause complete suppression of catamenia, but it may cause irregularity. It does centre in the right lower quadrant, and may cause just such a story as this.

The sharp pain is more characteristic of colic than of appendicitis. That colic might be appendix colic, of course. On the other hand it might be the colic of a ureteral stone. Apparently they did not think so enough to examine the urine. It might be colic of the bowel itself from some unknown irritation.

There is no record of a leucocyte count in the case. This story ought not to satisfy one, it seems to me, as to the diagnosis of appendicitis. Of course they saw the patient; we do not; and that is always an important factor. Apparently they were satisfied that there was something fairly definite there, and operation was done.

I am quite willing to admit that an appendix can do this, because it does cause a great many symptoms which are not typical of the cases we generally get. On the other hand I should want, myself, to make a little more careful examination of the urinary tract. I should want to have a bismuth enema at least.

DR. CABOT: With reference to tuberculosis?

DR. YOUNG: With reference to the localization of that tenderness. On fluoroscopic examination the roentgenologist can tell whether that tenderness is in relation to the cecum or not. He will push the cecum out of the way; if the tenderness follows it it is significant of trouble at that point.

I have no other diagnosis than appendicitis to make as a justification for operation. It seems

to me that tuberculosis certainly has to be considered.

DR. CABOT: You don't think they will find any active condition?

DR. YOUNG: I don't think they will. On the basis that it might be an irritant in the bowel itself, they may find nothing which will justify the belief that they have reached the real seat of the trouble. I have seen that happen many times.

DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Appendicitis.
Tuberculosis?

PRE-OPERATIVE DIAGNOSIS

Chronic appendicitis.

OPERATION

Ether. Right rectus muscle splitting incision. A slightly fibrous long thickened appendix which showed evidence of previous inflammation was excised. The pelvic organs were normal. The bladder was very much distended and full. Nothing was felt in the gall-bladder region. The incision was closed without drainage.

PATHOLOGICAL REPORT

An appendix 9 cm. long and fibrous.
Chronic appendicitis.

H. F. HARTWELL.

FURTHER DISCUSSION

Of course they make the diagnosis I expected them to make, which always annoys me—chronic appendicitis. From the pathological point of view that is right. Any appendix which shows thickening of the walls with round-cell infiltration and increased fibrous tissue is a chronic appendix pathologically, though there may never have been any signs clinically.

She died, to fit this story, of a post-operative sepsis from streptococcus. The evidence of intestinal obstruction here is of the obstruction that goes with peritonitis. I think Dr. Richardson will tell us that there is general septicemia with peritonitis as the local manifestation.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Chronic appendicitis.
General peritonitis.
Operation, appendectomy for chronic appendicitis.

DR. EDWARD L. YOUNG'S DIAGNOSIS

Appendicitis.
General peritonitis.
Septicemia, streptococcus.

ANATOMICAL DIAGNOSIS

1. Primary fatal lesions
(Appendicitis.)

2. Secondary or terminal lesions

General fibrinopurulent peritonitis.
Fibrinopurulent pleuritis.
Hemorrhagic edema of the lungs.

3. Historical landmarks

Operation wound.

DR. RICHARDSON: The abdomen was slightly distended and the wall a little tense. The peritoneal cavity contained a small amount of purulent fluid, but the peritoneum generally was coated with fibrinopurulent exudate which extended up even over the liver,—general fibrinopurulent peritonitis. Cover-glass from this exudate showed streptococci and leucocytes—no other bacteria. In the region of the base of the appendix, which was wanting, there was a secure ligature.

There was some fibrinopurulent pleuritis. In these cases of general peritonitis it is not very unusual to find an accompanying pleuritis. Hemorrhagic edema of the lungs is common with septicemias of the streptococcus hemolyticus type.

DR. CABOT: It was not quite clear how the peritonitis started; it did not seem to start from any leak in the appendix wound?

DR. RICHARDSON: No. Once in a while in hospitals streptococcus infections become numerous.

DR. YOUNG: This is part of that epidemic.

DR. CABOT: Has there been an epidemic?

DR. RICHARDSON: There have been numerous cases.

DR. CABOT: Is there anything more to say about epidemics of streptococcus in modern hospitals?

DR. YOUNG: I think not. It happens occasionally, and hunt as hard as they can and do as much as they will it runs its course, hits cases which it has no right to hit apparently, then stops.

tration of treatment, and (3) the amount tolerated. Negative clinical and serologic findings at birth are not always indicative of the absence of syphilis. It is advised that routine examinations be made at monthly intervals for the first six months and then every three months for the first two years. Microscopic examination of the placenta may prove of greater value in determining a latent infection than the result of the Wassermann reaction on the blood from the umbilical cord or from the veins during the early months of life. Occasionally cases of active syphilis with a negative serology are seen. Clinical manifestations must always take precedence over laboratory findings. Of 128 treated patients with active syphilis, 55 had received two courses or more of neo-arsphenamin and mercury intramuscularly; of whom 30 patients, or slightly more than 53 per cent., became negative clinically and serologically, the observation period now extending over two years in some instances. The remaining 73 cases consist of two groups—one made up of younger infants, of whom 23, or 30 per cent., became negative with less than two courses of injections given regularly, and the other made up of older children who had received less than two courses of treatment scattered over irregular intervals and who had remained positive. Lumbar puncture was performed on 128 children, with negative results in 114 and positive in 14. In the negative group, 74 children were negative clinically and serologically, while the remainder, 40, had a strongly positive Wassermann reaction; the positive group had either a positive blood or clinical signs of the disease. In a total of 54 syphilitic children, therefore, 14 cases of neurosyphilis, or about 25 per cent., were found, approximately the same as in adults. The prognosis of congenital syphilis depends on: (1) the amount of prenatal treatment; (2) the physical condition at birth; (3) the severity of the infection, whether visceral, cutaneous or neural involvement is present; (4) the time treatment is begun; (5) the type of treatment, and (6) the tolerance to treatment.

[A. W. C.]

THE DERMATOLOGIC ASPECTS OF RAT-BITE FEVER

O'LEARY, P. A. (*Arch. Derm. and Syph.*, Vol. 9, No. 3, March, 1924) reports two undoubted cases of this disease cured by arsphenamin. Rat-bite fever in general is identified by the history of a bite by a rat, cat or dog, with a primary incubation period of from ten to thirty days before the appearance of local reaction at the site of the bite; by constitutional prodromes and symptoms of a general infection with a two to seven-day intermittent fever; by the fairly characteristic erythematous indurated plaques in the skin which undergo exacerbation with each rise of temperature and subside between times; by the prolonged course (six months) in untreated cases; by the prompt response to the intravenous administration of arsphenamin or neo-arsphenamin; and by the finding of *Spirochaeta morsus-muris*. It should be added that the last mentioned criterion is not essential to diagnosis, as observers outside of Japan have been unsuccessful in isolating the organism. The differential diagnosis of the local reaction may include pyogenic cellulitis, giant chancre, and erysipelas, and on the basis of the constitutional symptoms, malaria, relapsing fever, and trench fever. The possibility of the acute leprous exanthem must not be overlooked. The treatment of rat-bite fever, as suggested by Hata, consists of the intravenous injection of one of the arsphenamins, given in doses proportional to body weight. It may be necessary to give one or two injections after the temperature has completely subsided, to prevent relapse. Following the first injection of arsphenamin, a Herxheimer-like flareup of the temperature with transitory accentuation of the lesions is the rule.

[A. W. C.]

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RESULTS IN THE TREATMENT OF CONGENITAL SYPHILIS

FORDYCE, J. A., and ROSEN, I. (*Arch. Derm. and Syph.*, Vol. 9, No. 3, March, 1924) summarize as follows: The success of prenatal treatment depends on: (1) the duration of the infection, (2) early adminis-

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THE ART OF MEDICINE AND THE ART OF LIVING

THE profession of medicine is an exacting one, and too often those who follow it become its slaves; he who should be master becomes servant. That it is exacting, that it makes strict demands on time, on patience and on skill, those who have adopted it well know, and those who contemplate it for their life endeavor should be aware of. Life is a series of interruptions, terminating in one grand climactic interruption; perhaps birth itself is an interruption of some existence that will never be revealed. Certain it is that the endeavor to order our lives, instinctive with us all, is more difficult in medicine than in almost any other walk of life.

It is this constant sense of impending interruption, this rapid succession of unforeseen situations, any of which may prove difficult to master; it is this feeling of being constantly with the nose to the grindstone that has made the practice of the Art of Medicine so inexorable in its mastery of the individual and has caused so many of our younger men to seek the sanctuary of the laboratory and the even tenor of an academic life, or the authoritative position granted by the practice of a specialty.

There is, nevertheless, every reason why we should persist in our attempts to organize our

work and our lives, to gain the mastery of the first and of its situations and to be in a position to escape it, when necessary, that we may enjoy the second. In order to derive the most satisfaction from both, the Art of Medicine must be mastered and the Art of Living must be cultivated. With too many men in all professions the pleasures of life are too long sacrificed to its necessities until eventually, unable to work and not knowing how to live, they are turned out to graze in barren fields.

It is very easy, in our natural desire to acquire the necessary volume of work, to become chained slaves to it; to give precedence, in every instance, to the convenience of the patient over our own. We would not preach a heresy—the necessity of the patient should never be secondary to the convenience of the physician—but too many physicians, over-willing to be martyrs to their practices, allow themselves to be shamefully imposed upon, and from a warped sense of duty forget, and encourage their patients to forget, that they too are human beings and entitled to the pursuit of happiness.

The laboratory sciences themselves suffer to some extent from this overwhelming sense of duty. Their devotees have in many instances been taught that theirs is a monastic life, a life of perpetual self-sacrifice; that they are a class set apart, a class leading a more difficult, and, they are given to suspect, a nobler life than the run of mortals. This pedestal, it may be surmised, is often erected as a substitute for more substantial recompense. In the attitude adopted both by the devoted practitioner and the ascetic scientist there may be at least a trace of personal vanity.

Each, then, must learn to live his life as well as to practice his profession. Each must have some avocation to turn to as a relaxation from the tiring exactions of duty. Public life, literature, art and music all have their uses and the professional man who cultivates them will find that his professional work as well as his proficiency in the Art of Living will reap the benefits.

MILK BOTTLES AND CAPS

So much interest is being attached to the cleanly production and handling and proper pasteurization of milk that the results of bacterial counts on milk containers and caps and the conclusions reached may be justifiably mentioned.

H. A. Whittaker, R. W. Archibald and I. Shere, of the Minnesota State Board of Health, report, in the Public Health report of the U. S. Public Health Service, May 2, 1924, on the relative efficiency of methods of sterilization of milk bottles at pasteurization plants in Minnesota. Where no sterilization is attempted the bacterial counts range from 59,000 to 8,400,000, with an average of 542,000. Sterilization with the steam

oven showed a bacterial range of 40 to 17,000, with an average of 2,000. Sterilization with steam sprayed through a single perforated plate, with the steam inlet valve manually operated, give results ranging from 20 to 4,000,000, with an average of 347,000. Where a power-driven washer and sterilizer is used, with hot water and steam sprayed into bottles through a series of perforated plates, the counts varied from 0 to 150,000, with an average of 5,425.

The ideal method was found to consist of this device with chlorine added to the rinse water, and it is concluded that an inexpensive chlorine solution places at the disposal of the plant operator a sterilizing agent which is always available for immediate use, and is more effective than steam alone.

The Nation's Health for May, 1924, contains the results of bacterial counts on milk bottle caps conducted by John L. Rice, Anna I. Van Saun and Katherine E. Haywood of the Department of Health of New Haven. Counts were made from milk bottle caps applied in various ways. Methods of capping and the condition of the capping machines were found to have a decided effect upon the bacterial counts on the used caps. The routine testing of capping machines is suggested. Hand capping did not appear to increase the bacterial count as much as might be expected, although the practice is discouraged from the sanitary standpoint. The presence of milk on the capping machines is suggested as an explanation of the increase in bacteria on the caps as the bottling progressed.

Two of the methods by which milk may be contaminated in the handling are suggested by these reports.

MISCELLANY

HARVARD GRADUATE SCHOOLS DAY AT DETROIT

MEETING OF THE MEDICAL ALUMNI

GRADUATE SCHOOLS DAY, on June 5, 1924, immediately preceding the meeting of the Associated Harvard Clubs, was a great success.

Thanks to the wisdom and foresight of Mr. Williams Thomas '73, President of the Harvard Law School Association, of Mr. Charles T. Greve '84, President of the Associated Harvard Clubs in 1924, the graduates of the Harvard professional schools of Medicine and Business Administration have been, like the graduates of the Law School, drawn together into the big Harvard Family Faculty and have been made to feel that they, too, are "Harvard men."

Thanks to the excellent plans arranged and carried out by the Detroit Committee, and to the cordial invitation and kind hospitality of Dr. Frederic Clinton Kidner, M. D., '04, the meeting of the Harvard doctors was well worth while. Special automobiles conveyed the doc-

tors from the Statler Hotel ten miles into the country to Dr. Kidner's home, where an excellent lunch was served on the veranda. The business meeting followed.

Your Secretary reported the results up to date of the campaign for the Medical School Dormitory, commenting on the fact that over 1,300 doctors have subscribed an average of close to \$70 apiece to the Fund, and expressing the hope that before long the Committee would be able to announce that more than 1,625 doctors, or over 50% of the Medical School graduates, had shown their interest by contributing. Although the sum of \$200,000 is far short of the total to be raised, the fact is by no means discouraging, since the campaign for larger gifts has, of necessity, been curtailed by the other and greater campaign to secure ten million dollars for the Business School and for the departments of Chemistry and Fine Arts. It is confidently expected that, so soon as this other campaign may be completed, interest in the improved facilities for medical education, of which a Dormitory is an essential part, may be reawakened with great profit. In the meantime every doctor can do his part not only by making sure that he has given, but by explaining the needs to his friends and earnestly soliciting their interest and support.

Dr. Edsall spoke at some length of the present day position of the Harvard Medical School. He emphasized the tremendous strides made in medicine in the past few decades and of the increasing importance of the relation of the individual doctor toward the community. The advances in medical knowledge nowadays are so great and so rapid that the School must not only provide the student with a substantial background of fundamental facts and processes but the School must so train the student that he will be able to evaluate the steps of future progress, and will be able to adapt himself to and to correlate his fundamental knowledge with these new changes. In the medical school today the student must learn a certain number of mere facts, but it is more important that he learn how to correlate these facts one with another and thus work out their relative importance for himself. In other words, he must be made to think. This is the reason why the number of didactic lectures has been reduced, and why two afternoons a week have been left free of scheduled exercises.

The examination system has been modified in keeping with these new ideas. No longer is the student catechized on his memory for a mass of rather isolated facts. On the contrary, great effort is made to bring out his general knowledge and his ability to apply it to concrete problems. For example, one question this year was "Write an essay of not more than 2,500 words, approximately one book, on any subject taught in the Medical School."

Dr. Edsall spoke about the Dormitory, em-

phasizing its importance from the educational point of view, by promoting contact between students in different classes and between students and their instructors. He spoke of it from the point of view of student health and of student health supervision, telling the story of the brilliant student who, because of poor living conditions, suddenly developed tuberculosis; and another story of the student with mumps, who did not realize its epidemic importance and who should have been taken out of school before he had exposed many of his fellow students to the disease.

It is a fact that in the Influenza epidemic the mortality among those men who were living under close supervision in the Reserve Officers' Training Corps was much less than among those whose living conditions was not so well controlled.

About 25 men attended the luncheon and meeting.

Substantially these same sentiments were expressed by Dr. Edsall at the combined dinner at the Hotel Statler in the evening. This dinner was presided over by Mr. Charles T. Greve, President of the Associated Harvard Clubs, and was addressed not only by Dr. Edsall but by Professor Beale and by Dean Donham. The presence of 140 men at this combined dinner makes the future success of graduate schools day assured and guarantees its permanent place as a part of the Associated Harvard Clubs' meeting.

Respectfully submitted,

FRANCIS M. RACHEMANN,

Secretary Harvard Medical Alumni Association.

WEEKLY REPORT OF INFECTIOUS DISEASES REPORTED TO THE MAINE STATE DEPARTMENT OF HEALTH

FOR THE WEEK ENDING JUNE 21, 1924

Chickenpox		Gonorrhea	
Ashland	14	Augusta	1
Baileysville	5	Alfred	1
Bangor	6	Canton	2
Bath	1	Kittery	1
Ellsworth	2	Lewiston	1
Lewiston	1	Livermore Falls	1
Paris	17	Portland	19
Portland	2	Union	1
	48		27
Diphtheria		Influenza	
Bangor	1	Paris	1
Poland	1		
Portland	7	Measles	
	9	Alna	5
		Auburn	3
		Boothbay	2
Auburn	1	Cornville	1
Brunswick	1	Garfield	9
Chester	2	Kittery	2
Gorham	6	Lewiston	21
Portland	7	Levant	1
			17

Paris	3	<i>Syphilis</i>	
Portland	3	Portland	11
Sanford	1		
South Portland	1	<i>Typhoid Fever</i>	
Topsham	3	Auburn	1
Waterboro	2	Bradford	1
West Bath	5	Milo	1
Westport	2	Portland	1
Winterport	1	Whitneyville	1
	65		5
<i>Mumps</i>		<i>Tuberculosis</i>	
Baileysville	4	Auburn	1
Fryeburg	1	Bangor	1
Portland	26	Brunswick	1
	31	Caswell Place	1
<i>Ophthalmia Neonatorum</i>		Danforth	1
Jonesport	1	Farmington	1
		Fort Fairfield	1
<i>Pneumonia</i>		Frenchville	1
Bangor	2	Keegan	1
Gorham	1	Lewiston	1
Lewiston	1	Madison	1
Paris	1	Mars Hill	1
Whitneyville	1	Portage	1
	6	Presque Isle	1
		Rangleley	1
		Van Buren	1
<i>Scarlet Fever</i>			
Deer Isle	1		16
Gorham	1		
Lewiston	6	<i>Vincent's Angina</i>	
Owls Head	1	Portland	2
Princeton	1		
Rockland	1	<i>Whooping Cough</i>	
Sanford	1	Portland	2
	12	Skowhegan	3
		Waterville	3
<i>Septic Sore Throat</i>			
Boothbay	1		8

DISEASES REPORTED TO MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

WEEK ENDING JUNE 21, 1924

Disease	No. of Cases	Disease	No. of Cases
Anterior poliomyelitis	2	Mumps	158
Chickenpox	108	Ophthalmia neonatorum	29
Diphtheria	142	Pneumonia, lobar	67
Dog-bite	10	Scarlet fever	176
Encephalitis lethargica	3	Syphilis	33
Epidemic cerebrospinal meningitis	4	Suppurative conjunctivitis	25
German measles	48	Tuberculosis, pulmonary	353
Gonorrhea	109	Tuberculosis, other forms	18
Influenza	1	Typhoid fever	14
Malaria	1	Whooping cough	37
Measles	559		

INFANTILE PARALYSIS STUDY

DR. MILTON J. ROSENAU of Harvard University is directing an exhaustive research to determine the nature of the infantile paralysis bacillus, says *The Nation's Health* (Chicago). A grant of \$12,000 a year for three years has been made by the Harvard Infantile Paralysis Commission for this purpose.—*Children's Bureau, Washington.*